

# AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING  
SHEET METAL CONTRACTING

AIR  
CONDITIONING  
SECTION

PAGE 89

ESTABLISHED  
8 8 0

JANUARY  
1 9 3 9

JANUARY  
1939  
DIRECTORY  
NUMBER

TS 200  
.A7

# ANNOUNCEMENT

to the Warm Air and Air Conditioning Industry of America

## ENTIRELY NEW DESIGN Prefabricated Duct and Fittings

*Exclusive by Lamneck*

*For all Forced Air and Air Conditioning Systems*

● In the February, 1938 issue of the AMERICAN ARTISAN, Lamneck Products, Inc., will make formal presentation of its 700 Series Prefabricated Duct and Fittings Systems.

Previewed, tested, checked, and re-checked by leading engineers of our industry, the 700 Series to be announced in February has received the unanimous stamp of enthusiastic approval by all who have previewed it.

Its extreme flexibility, its universal adaptability, and substantial reduction of both original cost and installation labor cost do mark it as the greatest step towards the solution of the installation problem yet made.

You are welcome to an advance copy of our February advertisement. Our new catalogs and manuals will soon be off the press. Of course, this material is free. We welcome your request for advance copies. Write today.



**LAMNECK PRODUCTS, INC.**

414 DUBLIN AVENUE • COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF  
WARM AIR HEATING AND AIR CONDITIONING SYSTEMS

11-10-38 21 Mar 40



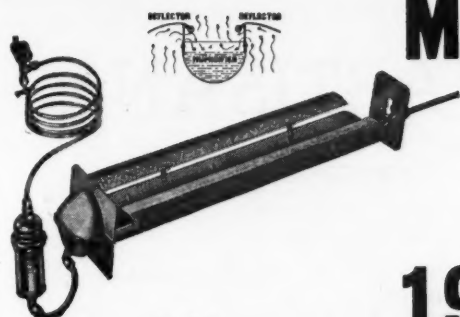
## Make More Sales and Additional Profits

with the

## 1939 Maid-O'-Mist Line

Automatic Humidifiers

Water-Line Controls

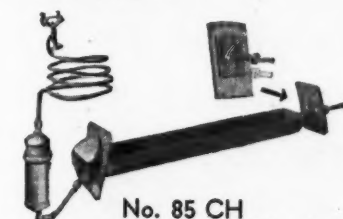


No. 9

### ZEPHYR Automatic Humidifier

For all types of furnaces. Pan, 4"x36", stamped from genuine sheet bronze (nine times as efficient as cast or sheet iron in heat transmission). Heating area exceeds 350 sq. in. Patented air deflectors. Patented adjustable overflow plate prevents over-saturation. Adjustable hood fits slope of furnace bonnet. Water supplied by new type Water Boy Safety-feeder, with water line adjustment and located away from heat to avoid corrosion. Equipment includes saddle valve, copper tubing, complete fittings. LIST PRICE \$15.50.

No. 11 Zephyr Twin (Not illustrated) For large furnaces or where a high percentage of humidity is desired. Consists of double unit fed by one Water-Boy. LIST PRICE \$22.00.



No. 85 CH

### Automatic Humidifier

Same design, construction, materials, as No. 9 Zephyr, excepting deflectors. Evaporating area 126 sq. in. Complete with all fittings. Patented adjustable overflow plate as illustrated. Very efficient for gravity heating furnaces. LIST PRICE \$13.20.



No. 58 H

### Automatic Humidifier

Comes complete as shown. Humidifier is built of bronze in 26" and 36" lengths. Water supplied through a No. 59-F Water-Boy feeder with thumb screw to adjust water line. It is fitted with enameled hood and overflow plates to fit a sloped or straight plenum of the furnace. LIST PRICE, 26" length—\$12.25, 36" length \$12.50.

No. 85

### Water-Boy Feeder

Small, attractive, positive-acting, corrosion resisting water line control valve. It is the result of long experience in manufacturing water feeders. All working parts mounted on a replaceable bonnet. Finished in satin nickel. LIST PRICE FEEDER ONLY \$7.50.



No. 50

### Midget Feeder

For Bucket or Pan Type Humidifiers. Midget ball cock, 7" long over all. Of Monel Metal, Nickel Silver, Brass, and Copper. Float adjustable for water depth 1" upward. Easily installed. LIST PRICE \$2.50.

The No. 50F includes 6 ft. of copper tubing and No. 8 Saddle Valve. LIST PRICE \$4.00.



No. 59 F

### Water Boy Safety Feeder

This combination consists of a Midget float-controlled Water Feeder, 6 ft. of 1/4" O. D. Copper supply pipe, No. 8 Saddle Valve, 2 ft. of 5/16" Copper Tubing, and Fittings to connect feeder to humidifier. Water Feeder is housed in an enameled reservoir, 6" x 2 1/2" x 2 1/2", with cover and thumb screw for adjusting height of the water line. LIST PRICE \$6.50.

No. 8

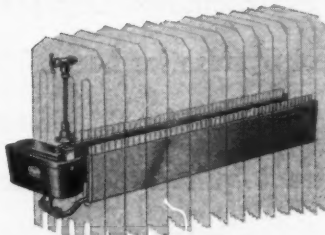
### Pipe Saddle Valve

To attach Pipe Saddle Valve to 1/2" and 3/4" water pipe, drill hole in side of pipe and fasten saddle bolts. Outlets for 1/4" O. D. copper tubing. LIST PRICE \$1.00.



No. 95  
Auto-Vent  
Humidifier

For steam radiators. Takes place of air valve. Automatically vents air from radiator and humidifies. Easily adjusted by set screw at bottom of valve. LIST PRICE \$3.75.



No. 30 Ol' Faithful  
Automatic Humidifier

For Hot Water, Vapor or Vacuum Steam Radiators. Two copper evaporators with patented wicks fit in between radiator sections and they are supplied by an enameled reservoir on end equipped with automatic float valve. Water supply may be taken from radiator or nearest water line. LIST PRICE, 24"—\$8.50, 34"—\$10.00.



## In This Issue

ONE of the problems this industry (and every other industry, large or small) will have to face before social security is finally solved, is the problem of giving men steady work. Eventually, ways and means must be found to insure a man of a steady income during 12 months of the year.

If this is not done, then our industry, and every other industry, can expect labor unrest. Here and there over the country employers are trying to solve this problem. The Jacob Brenner sheet metal shop in Fond du Lac, Wis., (see page 68) has turned to the fabrication of sheet metal specialties and in this way found the answer for 15 men. In his address before the National Warm Air Assn. (page 131) C. T. McCormick told how he is doing the same thing and gaining world-wide renown for so doing.

★

Letters have come in from all parts of the country asking for more information about Ft. Wayne, Indiana's experience with its heating code.

On page 72, H. J. Furge, Heating and Sheet Metal Inspector, tells about the problems, explains the examinations, discusses methods of insuring higher standards, and other experiences common to code enforcement.

★

During the last three years this publication has taken some small part in the controversy raging over Price per Opening. Generally, our attitude has been that price per opening is fraught with danger and should be avoided. But, despite our small efforts, more and more contractors use this method of bidding—not always because they think the idea good, but because they have to.

So we began, several months ago, to send out questionnaires to find out just what is offered for going prices per opening in as many cities as possible. If you want to know what is included in bids submitted for 40 cities see page 79.

★

There appears in this month's Air Conditioning Section descriptions of two jobs worth study. The first is a very large house which presented the common problem of remote sections hard to heat. The solution was found in three furnaces. (See page 101.)

And near Chicago, a group of 16 stores, "tax-payers" we call them out here, were heated by 11 gas-fired furnaces and everyone is happy. The description is on page 125.

# AMERICAN ARTISAN

With which is merged

**FURNACES  
AND  
SHEET METALS**

AND

**Warm-Air  
Heating**

Covering All Activities in

Gravity Warm Air Heating

Forced Warm Air Heating

Sheet Metal Contracting

Ventilating

Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 108, No. 1

January, 1939

Founded 1880

## CONTENTS

|  |     |
|--|-----|
| 1939—Looking Forward .....                           | 67  |
| Brenner Works Men Year Through Making Specialties    | 68  |
| First 18 Months' Experience with Ft. Wayne Code .... | 72  |
| Roofing and Skylights on New York Museum .....       | 76  |
| Price per Opening Survey for 40 Cities .....         | 79  |
| Cleveland League's 10-Weeks Advertising Campaign     | 84  |
| Arnold Kruckman's Washington Letter .....            | 86  |
| National Warm Air Assn's. Silver Anniversary .....   | 131 |

## THE AIR CONDITIONING SECTION

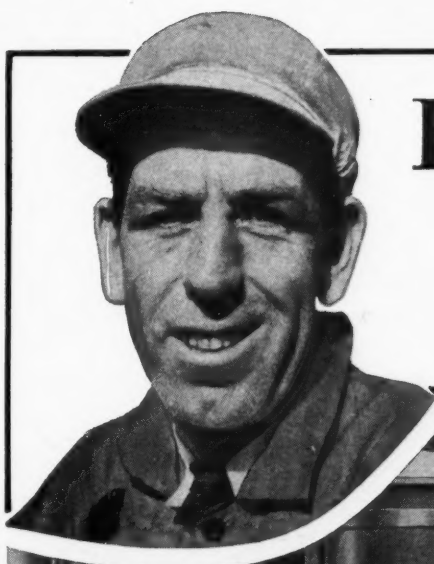
|  |     |
|--|-----|
| G. A. Voorhees Precalculated Engineering .....       | 91  |
| Sectional Control System for Large Houses .....      | 101 |
| Cooling Control Systems for Residences .....         | 107 |
| Weight and Time Required to Fabricate Ducts .....    | 113 |
| Summary of Oil Burning Furnace Design .....          | 119 |
| Basementless Heating Systems for 16 Stores .....     | 125 |
| Air Conditioning Conferences, Conventions, etc. .... | 128 |

Member of Audit Bureau of Circulations—Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago. Branch Offices—In New York, Room 1734, Grand Central Terminal Building, Murray Hill 2-8293; In Cleveland, 2128 Rossmore Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191. Copyright 1938 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, \$2.00; Foreign, \$4.00. Single copies, U. S. and possessions, \$.25. Back numbers, \$.50. January, 1938, Directory Issue, \$1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

**More than 8,000 Copies of this Issue are being distributed**



# Four-Legged Peaches in Georgia

by Tim Shears



*Monel blending and ageing tanks in a Southern bottling plant. Made from 14 gauge standard cold-rolled sheet, all-welded construction.*

ONE THING I can go for in a big way is Southern hospitality. Not to mention Southern belles. So there's no kick from me when the boss says to pack my grip and grab a train for Georgia.

I'm told to call at a big bottling plant where one of our customers has put in a sizable job. Twelve Monel tanks for blending and ageing this syrup they serve at soda fountains. The tanks are all 230 gallon size, made out of 14 gauge cold rolled sheet, welded at the seam and also top and bottom. Each tank has a Monel propeller and shaft to stir up the syrup.

It's a beautiful job of rolling and welding and I'm giving it the once-over when along comes the contractor's foreman. "What do you think of them tanks?" he says, sort of proud I thought. "Well," I says, "they look pretty good to me. In fact," I goes on, facetious like, "I'd call 'em a dozen Georgia peaches, even if they do have four legs." "Coming from you," he

cracks back, "that means plenty ... to judge by the way you eye the two-legged ones."

But my eyes was skinned for more than peaches ... two-legged or four. And there sure was plenty to see around that plant. Tanks, sinks, strainers, hoppers, pails ... a regular paradise for a sheet metal contractor.

"Get much of that business?" I asks the local wise-cracker. "An' how!" he comes back. "Every time a pail begins to leak or a tank or hopper looks like it's starting to go, it's another order for us. And," he adds, "every job is Monel. They'll use nothin' else in this plant. It keeps their syrup pure, and the equipment lasts a lifetime."

"Which ain't so good for you," I says, kidding. Which doesn't bother him a bit. "Ain't so good my eye!

Why, every plant around here *knows* about our Monel jobs. And just replacing the old equipment is goin' to keep us busy for years. What's more," he continues, givin' me the wink "... there's money in these jobs. Monel's a cinch to work with. Never a job spoiled. And always top price for scrap."

\* \* \*

Money in Monel is right. I don't need to tell you what an easy metal it is to handle. And plenty of jobs to be had if you know where to look.

If you need any help on either score drop me a line. Between us we'll soon figure out the best place to look for jobs ... and the easiest way to do 'em.

THE INTERNATIONAL NICKEL  
COMPANY, INC.  
67 Wall Street New York, N. Y.

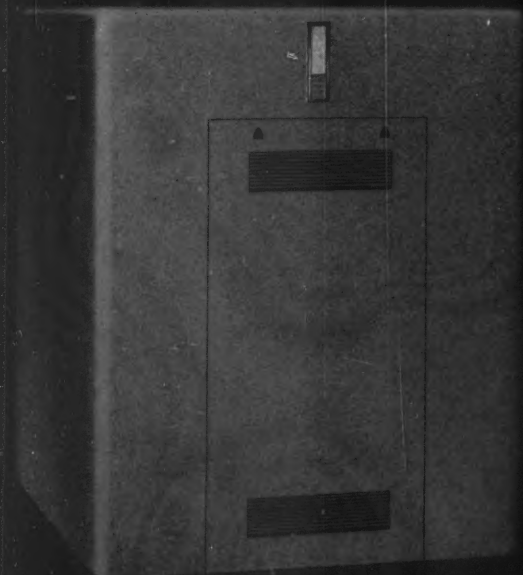




# SUNBEAM

## WARM AIR FURNACES AND

### A COMPLETE LINE OF SUNBEAM AIR CONDITIONERS



**FOR OIL**—Sunbeam Air Conditioner, Series 1100 is specially engineered for oil burning. Has integral co-ordinated Sunbeam Oil Burner. Capacities range from 101,000 to 331,000 BTU at register.

**SUNBEAM OIL BURNER**—pressure type with maximum economy, silent action and trouble-free operation.

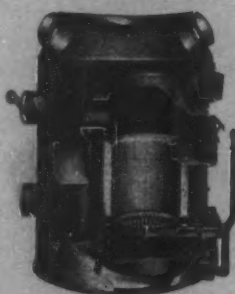


**FOR COAL**—Sunbeam Air Conditioner, Series No. 80, with steel heating element. Also available in 3 other types. Capacities range from 76,000 to 252,000 BTU at register.

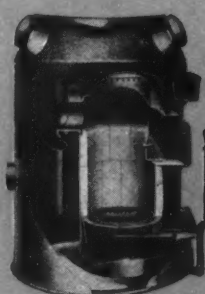
**FOR GAS**—Sunbeam Air Conditioner, Series D, with cast iron heating element—all valves, wiring and piping concealed. Also available is the low priced Series "M", with steel heating elements. Capacities range from 61,200 to 267,750 BTU at register.



### A COMPLETE LINE OF SUNBEAM GRAVITY FURNACES



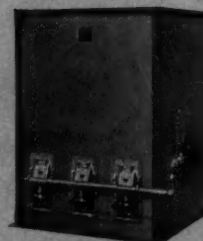
**Series No. 5000 (Steel)**  
Made of finest materials including riveted and welded No. 7 gauge boiler plate steel.



**Series No. 500 (Steel)**  
Riveted and welded for long life and leak-proof construction... a quality furnace at a low price.



**Series No. 1000 (Cast Iron)**  
Has one-piece radiator, slip-on fronts, duplex grates and machine-molded castings of uniform strength.



**Series "O" (Gas Furnace)**  
Highly efficient, yet moderate in price. Heating element constructed of high corrosion and rust-resisting steel.

SUN

Sunbeam Grill direct radiation. The grille warms every and



# SUNBEAM



## AIR CONDITIONING UNITS

*offer you*  
**PROFITABLE LEADERSHIP**  
*Through*

- 1—A Complete Line of Air Conditioning Units, for Burning Oil, Coal and Gas.
- 2—A Complete Line of Warm Air Furnaces . . . Cast Iron and Steel for Burning Oil, Coal and Gas.
- 3—Air Conditioners and Furnaces for all types of Homes . . . Large or Small . . . New or Old.
- 4—A Sunbeam Conversion Oil Burner for installation in virtually any type of heating plant.
- 5—Sunbeam Registers and Grilles in a wide range of types, sizes and prices for Air Conditioning and Gravity Systems.
- 6—Prices That Meet Competitive Bidding . . . and Give You a Greater Profit Margin.

*Plus*

- 1—Convenient Warehouse Stocks Everywhere.
- 2—A Program of Consumer Advertising.
- 3—Many Types of Dealer Helps.
- 4—An Easy Time Payment Plan.

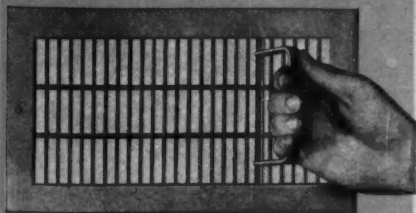
MORE HEATING CONTRACTORS SELL SUNBEAM THAN ANY OTHER MAKE

# FOX FURNACE DIVISION

OF AMERICAN RADIATOR COMPANY . . . ELYRIA, OHIO

Fox Furnace and Sunbeam Mean Pioneering in Air Conditioning and 55 Years Devoted to Heating Equipment Manufacture.

### SUNBEAM Registers and Grilles



Sunbeam "Fabrikated" Register No. 321-A. Grille Bars are vertical and air flow can be directed straight, left, right or any combination of these three positions.

The Sunbeam line of steel registers and grilles is complete. There is a Sunbeam warm air register or return air grille for every need — air conditioning and gravity, and for every price demand.

### PLAN TO ATTEND SUNBEAM ENGINEERING SCHOOLS

Sunbeam jobbers, with the Fox Furnace Organization co-operating, will conduct Air Conditioning Engineering Schools in approximately 100 cities. Schools in session during winter and early spring months of 1939. Coupon opposite will give you information on school in or near your city. Return it today.

FOX FURNACE DIVISION of American Radiator Company, ELYRIA, OHIO.

☐ Please send me complete details of "Profitable Leadership" with Sunbeam.

☐ Please give me data on the Sunbeam Air Conditioning Engineering Schools to be held in or near my city.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

AA-1-39

Announcing  
the New

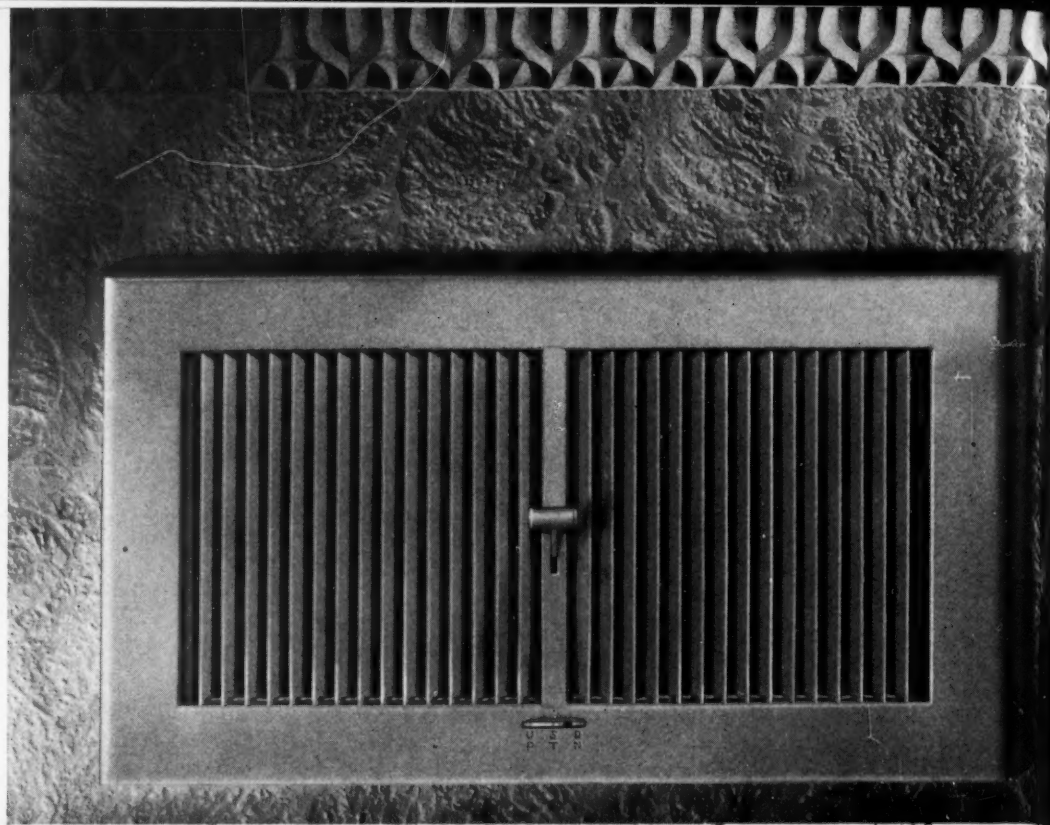


No. 86 DESIGN

with

TURNING  
BLADE  
VALVE

Applied for



# A Truly "ALL-PURPOSE" Register

with **PERFORMANCE** and **FLEXIBILITY** NEVER BEFORE APPROACHED



VALVE OPEN

Simply set the regulator and open the valve (from the front) to get desired deflection, 20° UP, STRAIGHT, or 20° DOWN.



VALVE CLOSED - AIR-TIGHT

The Only Register in Existence  
Combining All These Features:

## ADJUSTABLE DOUBLE DEFLECTION

Air Flow quickly adjustable UP or DOWN and SIDEWAYS—on the job!

Uniform distribution of air over entire face—with uniform velocity.

Negative resistance through elimination of turbulence.

Attractive appearance—excellent concealment of duct.

Furthermore, this one register design is interchangeable in all H & C installation frames. Think what this means in ordering and stocking! By standardizing on this one design, you are in a position to handle any job, any time.

It will be well worth your while to wait for this outstanding register. No. 86 Design will be ready for delivery in April-May. Complete details on request.

# HART & COOLEY MANUFACTURING CO.

Warm Air Registers  
Damper Regulator Sets



Air Conditioning Grilles  
Dampers, Chain, Pulleys

61 W. KINZIE STREET, CHICAGO, ILLINOIS  
ENGINEERING OFFICE AND FACTORY • HOLLAND • MICH.





THE *Symbol* OF THE NEW  
AUTOMATIC HEATING

## *Twenty below or twenty above* **COMFORT NEVER VARIES**

*The Accelerator Does It...*

**W**HY let your customers worry along with an "almost" modern heating system when by the simple installation of one or more of the series of new M-H Controls they can enjoy clock-around winter comfort, not possible even to millionaires five years ago. For example, the new M-H Acratherm, with its exclusive Heat Accelerator "does things" to home heating which the best ordinary thermostat made cannot

accomplish. The Accelerator actually irons out heating ups and downs, because of its uncanny ability to sense temperature changes before they occur. It so governs the operation of the Automatic Heating Burner that the temperature, which any family demands for comfort, never varies, regardless of outside weather. Dependable controls cost less than service. Depend upon controls bearing the M-H Symbol. Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue So., Minneapolis, Minn.

# MINNEAPOLIS-HONEYWELL

BROWN INDUSTRIAL INSTRUMENTS  
NATIONAL PNEUMATIC CONTROLS

*Control Systems*

APRIL

MAY

JUNE

JULY

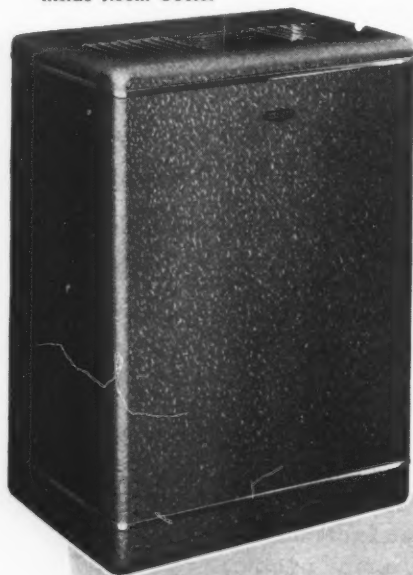
AUGUST

**KEEP THE SALES CURVE**  
*Going up*  
**ALL SUMMER**



Utility Dezert Cooler  
 Model No. 16K-3500 CFM

Utility's Modern New  
 Inside Room Cooler



*with*  
**UTILITY DEZERT KOOLERS**  
*and new Inside Room Coolers*

All your customers are prospects for summer comfort—they look to you for cooling equipment too. Give them real comfort cooling—and at the same time build the most profitable summer business you ever had—with Utility Dezert Koolers and new Inside Room Coolers.

The market for Utility evaporative coolers has been proven by thousands of sales in the last two years—yet this market has hardly been touched. To help you make money in this outstanding field, Utility Fan Corporation offers an effective, proven, sales-building program with striking advertising and literature that will build business for you.

You can offer Utility Dezert Koolers with complete confidence—they are proven in more successful installations than all others. Features include:

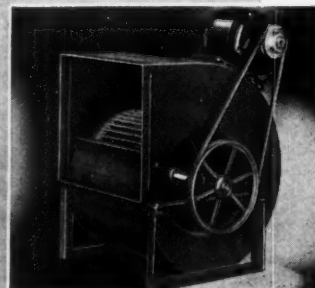
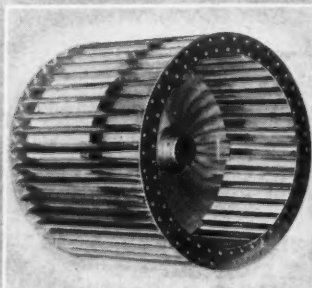
Dynamically balanced, full-floating Utility blower ★ Improved "No-Sag" filtering and cooling pads ★ Sturdy construction of rust-resisting steel ★ Self-contained water recirculating system (optional) ★ Volume control by variable speed pulley ★ In 8 models, from 1000 to 10,000 CFM—for homes, stores, shops, theaters, offices, schools, churches, hotels and factories.

**THE NEW UTILITY INSIDE ROOM COOLER** brings you a completely new and important market.

Effective cooling by evaporation—at a fraction the first cost and operating expense of other types of cooling equipment. Delivers large volume of air that can be instantly directed by means of the adjustable grills. Plugs into any AC light socket. Water recirculating system connects to supply by 1/4" copper tubing. Entire unit is full-floating, quiet in operation.

**UTILITY FAN  
 CORPORATION**

2528 South Santa Fe, Los Angeles, California





# HANDY PIPE

PIPE FOR  
ALL NEEDS

IS "*Handy*"  
BY NAME,  
TO GET,  
TO USE!

Because of quality materials, correct design and true workmanship, sections snap together quickly and properly.

It keeps costs at a minimum and satisfaction at a maximum. 72 years of experience go into it.

If you haven't our Catalogue No. 51 (together with the duct-work supplement) your information isn't up to date. Just say you want it—on a post-card or on your letterhead.

FRICTIONLESS DESIGN

ELBOWS  
ALL KINDS  
AND SIZES

FURNACE BONNETS

COLD AIR PIPE

EVERY SIZE WANTED

F. MEYER & BRO. CO. PEORIA, ILLINOIS

F. MEYER & BRO. CO. Peoria, Ill.  
Please send your catalogue No. 51  
duct-work supplement.

ENGINEERING SERVICE  
SELLING HELP  
CO-OPERATIVE ADVERTISING

We will be the exclusive Weir-Meyer dealers in this territory.



600 Series WEIR Furnace and Air Conditioner

P Series WEIR Furnace and Air Conditioner

K Series WEIR Stoker Fired Air Conditioner

WEIR Stoker

## For All Fuels COAL..OIL..GAS

The WEIR-MEYER Lines of furnaces and air-conditioners present the widest variety in the industry including types specifically designed for every kind of fuel: Oil and Gas automatically and Coal units for stoker or hand firing.

Only a representative group is shown here, including the "bread-and-butter" round-cased units as well as most advanced designs or today's most modern jobs.

And where PRICE becomes a determining factor, the newly-introduced "P Series" Weir will help settle all arguments in your favor!

A complete folio, showing all types of WEIR-MEYER heating and air-conditioning equipment is available for dealers interested in improving their position.

# WEIR-MEYER

## HEATING AND AIR CONDITIONING





*When you sign up with Weir-Meyer*

*your own business future  
is more secure . . .*

More secure — because the WEIR-MEYER Dealership is much more than an ordinary dealer relationship . . . it is an EXCLUSIVE franchise which offers you something you can "sink your teeth into" and build definite plans on.

More secure — because we co-operate . . . but we do not dictate. You are utterly INDEPENDENT . . . you are your own boss in your community . . . you build up your own business . . . and keep it. As proof of our "low dealer turn-over" we point out that many WEIR dealers have been constant for 25 years and longer!

More secure — because this Company is substantial, with an enviable 72-year history. Because we offer you the most complete line in the industry . . . complete as to price-range, sizes, types of fuel and important features.

More secure — because this Company has always pioneered . . . and will continue to LEAD. FIRST in the development of the STEEL warm-air furnace . . . FIRST in outstanding contributions toward today's forced warm-air circulation and air-conditioning. We consider it a part of our business to anticipate wants even before they are wanted—and WEIR-MEYER dealers have always been in a leading position!

If the above paragraphs describe a Company and a set-up of which you would like to become a part, we will welcome your request for full details on the coupon, on your letterhead or in person.



**THE MEYER FURNACE COMPANY**  
**PEORIA, ILLINOIS**

Established 1866  
Manufacturers of WEIR and MEYER Furnaces  
and Air Conditioning Equipment



MEYER Gas-Fired  
Air Conditioner



C and D Series  
MEYER Gas Furnaces



WEIR Oil-Fired  
Air Conditioner



MEYER Oil Burner

THE MEYER FURNACE COMPANY

Peoria, Illinois

Please send details of the Weir-Meyer proposition. (Sign or clip to your letterhead.)

# HANDY DUCT WORK MEANS *Known* COSTS



HANDY PIPE

Unexpected costs come out of expected profits—and sometimes eat them up!

**HANDY** forced-air duct-work is scientifically designed; properly made with efficient equipment by capable workmen who use only the best of materials. Our catalogue correctly informs you on designs, shapes—**AND COSTS.** It really saves you money!

# RADIATOR SHIELDS FOR ADDED PROFITS

Radiator shields mean cleaner walls, and they add a degree of improved appearance that appeals. These shields help you get a profit from "radiator" jobs—and the evaporator type helps you sell the advantages of "moist warm air."

You order them, finished or unfinished, in sizes as needed on each job. Our catalogue gives all details.



**F. MEYER & BRO. CO.**  
PEORIA, ILLINOIS







## Large Stocks...Uniform High Quality...Immediate Shipment

- Ryerson enters the New Year with large and complete stocks of Certified Steel on hand for immediate shipment. Whether you need a pound or a carload, quick personal service is assured.
- We shall be pleased to send you the

Ryerson Stock List containing complete information on all steel products.

Hot and cold rolled carbon and alloy bars, bar size and structural shapes, wide range of analyses in plates and sheets, boiler and mechanical tubing, tool steel, rivets, bolts, nuts, etc., etc. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

# RYERSON STEEL-SERVICE

# U.S. IS

***TO HELP YOU TAKE ADVANTAGE OF***

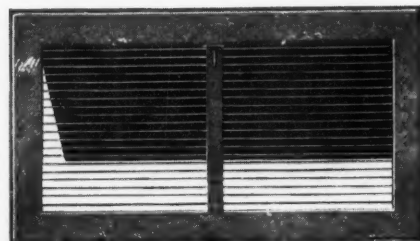
**Advanced and Most Complete Lines of the  
FINEST in AIR-CONDITIONING REGISTERS and GRILLES**



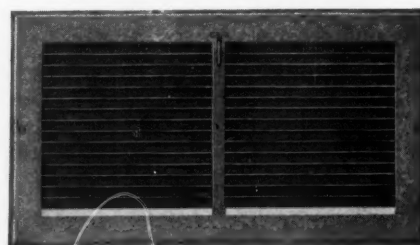
New Inset Panels for Louver-Type and Adjustable-Bar Registers.

**New Inset Panels  
Reduce Assortment  
of Air-Conditioning  
Register Stocks As  
Much As 80%**

Inset panels are used with Horizontal-Bar Designs of Louver-Type Registers (153 and corresponding styles) and Adjustable-Bar Registers (145 and corresponding styles). This definitely is the Last Word in Standardization and Simplification of your Air-Conditioning Register Problem. U. S. Louver-Type Registers afford closed-space non-vision features of "High list" lines at very competitively low cost. U. S. Adjustable-Bar Registers (60° Up Flow to 60° Down Flow) adjust without marring Register Finish. Also furnished in Vertical Adjustable-Bar Styles.

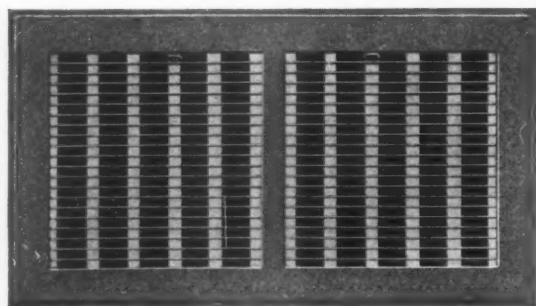


Style 153—Louver-Type Register



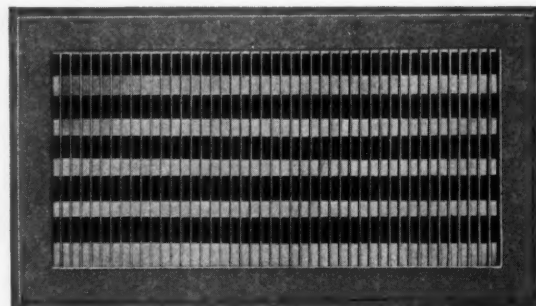
Style 145—Adjustable-Bar Register

**A NEW LINE of Individually-Set and Connected Multiple-Valve  
AIR-CONDITIONING REGISTERS**

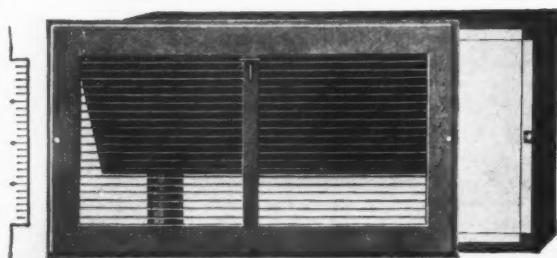


Style 153 V. V. L. or 145 V. V. L.

Vertical or Horizontal Back Blades—1" deep—connected knob operated or Individually Set. Can be furnished with any design of Air-Conditioning Register. See General Catalog No. 27, 1939 Edition. A line you have needed that cuts no stack head space. Sealing gaskets furnished.



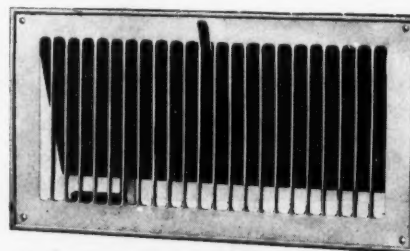
Style 178 H. V. I. or 149 H. V. I.



Style 170—Straight Flow with Flange-over Baseboard Frame

**REDUCE INSTALLATION LABOR  
COST with STYLE 170—Needs no  
Stud-Frame—Box Flanges over 7/8  
inch Baseboard and SEALS. See  
Illustration.**

**STYLE No. 102 Meets all needs  
of the Lowest Cost Type of Non-  
Directional Flow Register. See  
New Low Lists.**



Style 102—Vertical Bar Design  
Bars folded and pinched

# PREPARED!

## *THE BIG BUILDING YEAR AHEAD*

**By Actual Comparison—The Best in Gravity REGISTERS and FACES**

### The Neatness, Capacity, and Strength of U. S. Steel and Trussteel Floor Registers Astounds the Heating Industry

Natural wood grain finish photographically reproduced and transferred—maximum free area for fast efficient circulation—rugged strength to withstand years of use—job-proven easy installation features—never before has the heating industry been so enthusiastic in its use and indorsement of U. S. Steel and Trussteel Floor Registers and faces.

1939 promises great advances in home building and heating installations. Insure good profits and complete satisfaction on every job by installing modern, dependable U. S. Registers.

U. S. Baseboard Registers are Above Comparison

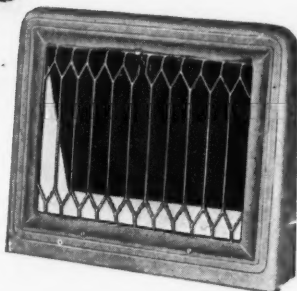


#### NATIONAL

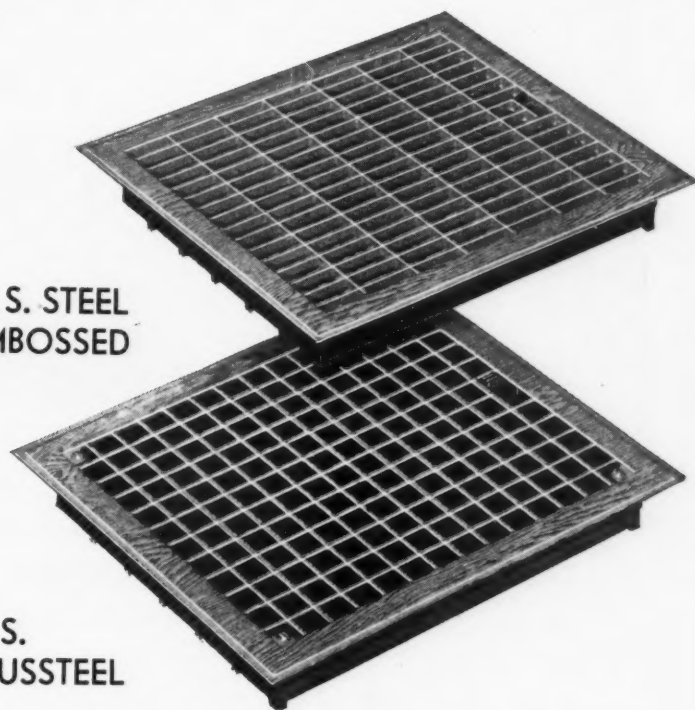
Hundreds of thousands of installations have proven the value of this ever-popular Diamond Lattice Design. It always was and always will be a great buy for the money.

#### PANAMA

On top in popularity polls of Bar-Type Registers from coast to coast is the famous U. S. Panama Design. It's in "good taste" in every type of home.



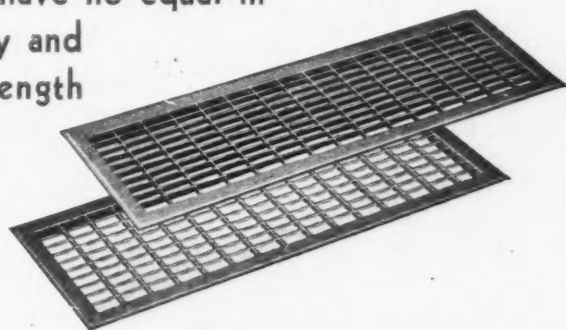
#### U. S. STEEL EMBOSSSED



#### U. S. TRUSSTEEL

U. S. TRUSSTEEL and Reinforced Embossed STEEL Faces have no equal in Smooth Beauty and Superior Strength

The Seamless Corners of Trussteel Faces and the Strength of U. S. Embossed Steel Faces has justly earned their popularity and preference.



Send Today for the New 1939 Edition of Catalog No. 27

## UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.





\*He's YOUR prospect!

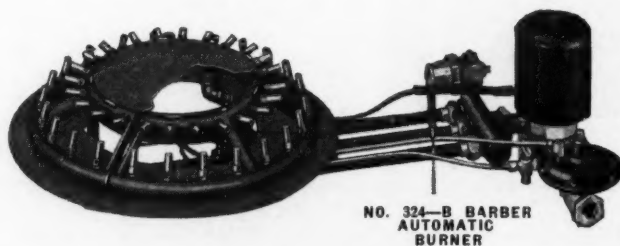
# Portrait of a Fireman\*

*White collar worker? Yes—that's me—at the office! But not at home. There I start the day and end it as a coal-heaver or an ash-man—feeding the furnace and cleaning up the mess! Whew!*

Even a two-fisted man's man doesn't go for that nasty job of stoking a solid-fuel furnace. Women hate it, sure, but men hate it too, especially fastidious men. It spoils their clothes and their disposition.

Equipment for automatic gas home heating has a tremendous appeal to *men* as well as women. Tell your male customers how they can spend their evenings at home in peace—free from the soot and slavery of furnace tending. Show them the easy, economical way to gas heat *without* scrapping their present furnace or boiler—with a Barber Conversion Burner. They'll see the point!

The "B" Model shown comes in 8 sizes for round grates 12" to 34" in diameter. There is also a wide range of sizes for oblong grates. Both round and oblong conversion burners now adjustable at time of installation to fit combustion chamber. Patented BARBER Jets insure complete combustion, with a "scrubbing" flame action on walls of firebox. No fire brick or refractory elements needed. Baltimore Safety Pilot. Listed in A. G. A. Directory of Approved Appliances. Ask for Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.



## THE BARBER GAS BURNER COMPANY

3704 Superior Avenue  
Cleveland, Ohio

*Address Michigan Inquiries to*  
The Barber Gas Burner Company of Michigan  
4475 Cass Ave., Detroit, Michigan

# BARBER *Automatic* JET GAS BURNERS



# PEERLESS

**HAS THE LINE**

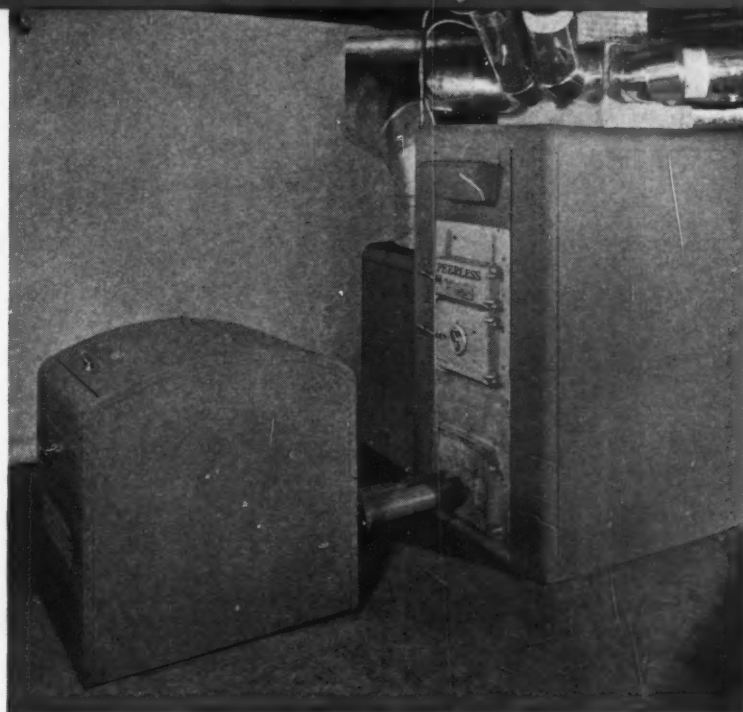
**FOR '39!**

## A FURNACE FOR EVERY KIND OF FUEL AND FOR EACH SIZE AND TYPE OF HOME

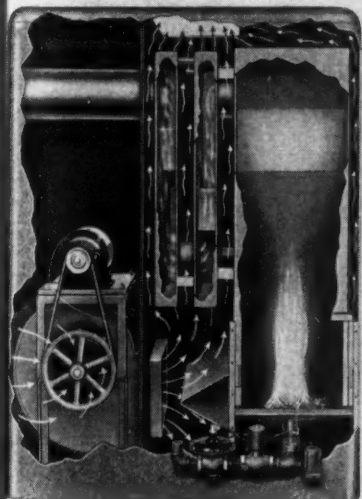
● What does *your* customer want? Does he live in a palatial home on the boulevard, or in a modest cottage? Does he want to burn *coal, coke, oil, or gas?*

No matter what his wishes or requirements may be—you can satisfy them *exactly*, at a price that will get the business for you—if you hook up with *Peerless* for 1939!

Here, in what is probably the most complete line of heating and winter air conditioning units ever offered to the trade, one of the oldest, best-established manufacturers gives you *everything* from the conventional round type manual fired furnace to the completely automatic oil or gas



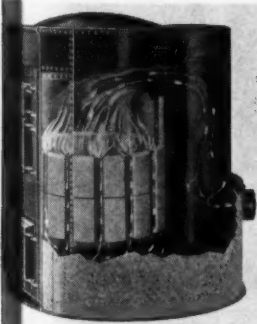
Shown above is the latest design Peerless Streamliner steel furnace, complete with large, silent dynamically balanced blower, wafer type filters, automatic humidifier and a Peerless Stoker. Hopper or bin feed available. Truly a DeLuxe unit, with every scientific improvement in combustion, fuel utilization and heat circulation, at a remarkably low price. Same unit available for use of oil or gas as fuel. Beautiful Morocco baked enamel finish in forest green. Sold with or without stoker, ABC oil burner or gas burner.



### AUTOMATIC HEAT for the Small Home

Here's an amazing value for the small home. Completely automatic gas-fired furnace, blower, filters and humidifier — all housed in one compact attractive streamlined Morocco baked enamel cabinet. Size 3' x 4'. May be installed in basement or first floor service room. Remarkably efficient and economical. Easily and quickly installed. Just the thing for replacements and new low cost homes. Sells "on sight." Makes a friend and booster of every customer.

fired conditioners with blowers, filters, humidifiers and controls, in beautiful streamline cabinets. Just tell us what you want. *We have it*—and can save you money in combination shipments, all from one factory. Write today for catalogs, discounts and full information on individual units or on our complete line.



### Round Type Steel or Cast Iron Furnaces

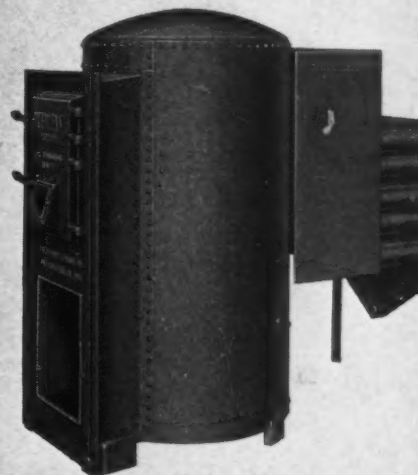
The Peerless line of conventional round type furnaces (steel or cast iron) is the result of more than 35 years successful manufacture. Each unit gives long life of service. Maximum fuel economy. Made in all wanted sizes. Prices are lower, with liberal discounts to the trade.

### REPAIR PARTS

*Largest stock of repair parts for all makes of furnaces in the central states.*

### Will Make Friends and PROFITS

Interior view (streamlined Morocco baked enamel cabinet removed) showing heating unit of the PEERLESS DeLuxe for oil or gas. Combustion drum is heavy gauge boiler plate steel, closely riveted and arc welded. Note Heat Transfer tubes, and elevation of combustion chamber above the floor allowing better equalization of air circulation. Here's a job you'll be proud to install and one that will give absolute satisfaction.



## PEERLESS FOUNDRY COMPANY

Pioneers in Warm Air Heating for over a third of a century  
1853 LUDLOW AVENUE, INDIANAPOLIS, INDIANA



FOR THE 80<sup>th</sup> YEAR--

Since 1859, we have been privileged

to wish the trade

A MOST HAPPY AND  
PROSPEROUS NEW YEAR

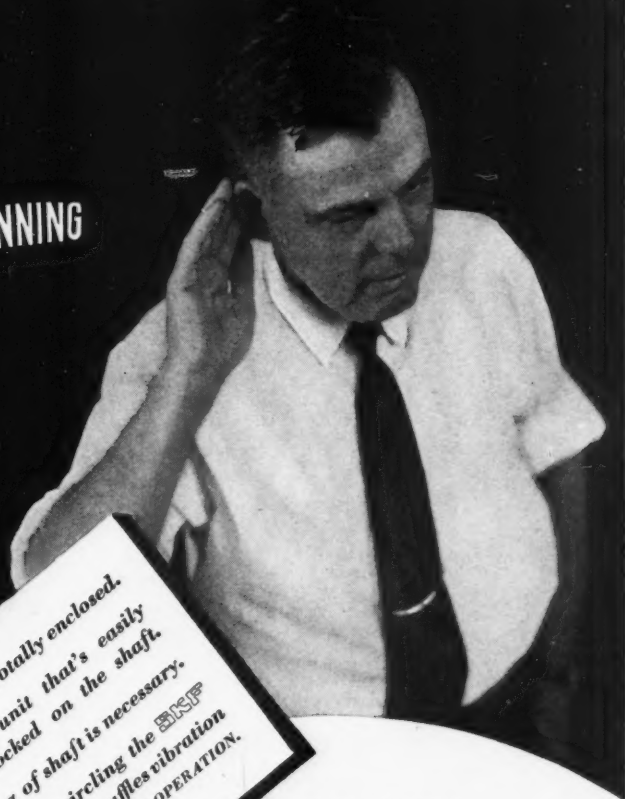
THE J. M. & L. A.  
**OSBORN Co**  
BUFFALO • CLEVELAND • DETROIT  
*Metals and Metal Products*

A DEPENDABLE SOURCE OF SUPPLY FOR 80 YEARS



# New!

## YOU HARDLY KNOW IT'S RUNNING



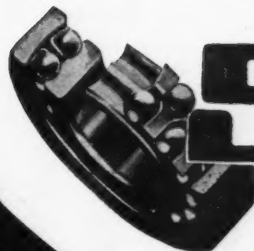
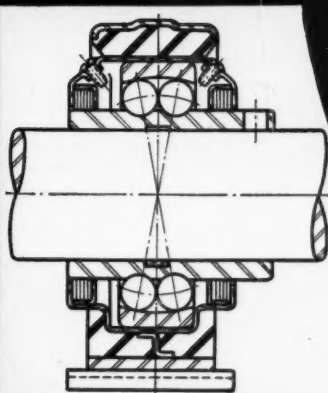
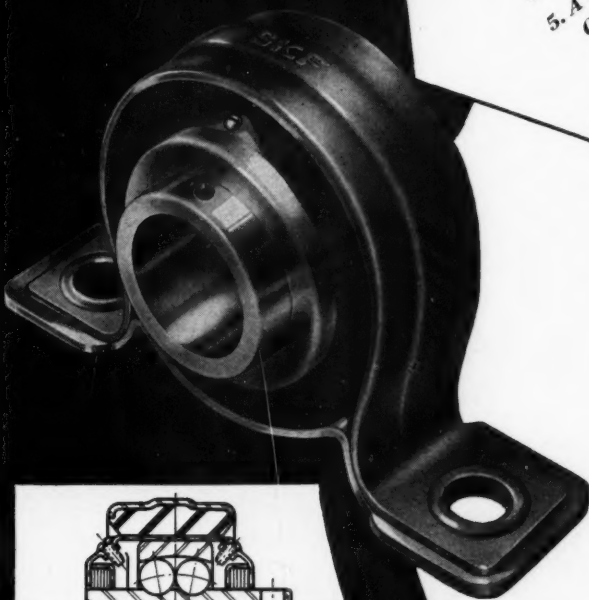
1. Self-contained. 2. Totally enclosed.
3. A self-aligning unit that's easily slipped and locked on the shaft.
4. No machining of shaft is necessary.
5. A rubber ring encircling the SKF Grip-Lock Bearing muffles vibration noises and insures QUIET OPERATION.

### SKF Rubber Flex PILLOW BLOCK

No longer do vibration noises impair the quiet operation of fans and other equipment. For SKF has developed a pillow block that *muffles* vibration noises.

This latest development—the SKF Rubber Flex Pillow Block—is equipped with an SKF Grip-Lock Bearing in a RUBBER RING to assure quiet operation. It is designed to isolate completely the rubber from the bearing, and provision is made on both sides of the bearing to permit additional lubrication. Effective seals protect the bearing. Send for descriptive sheet. SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

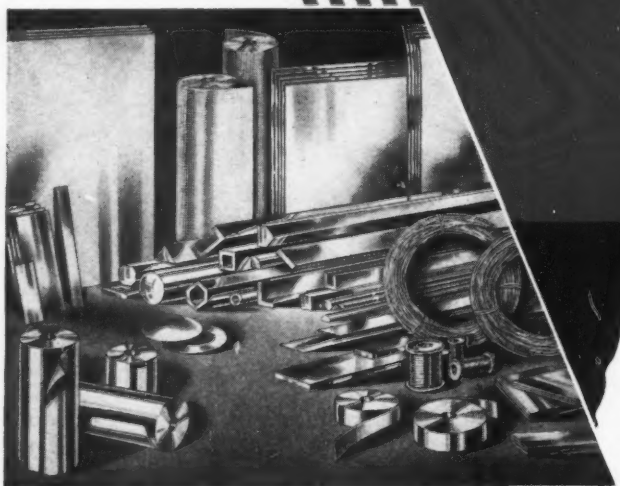
4216



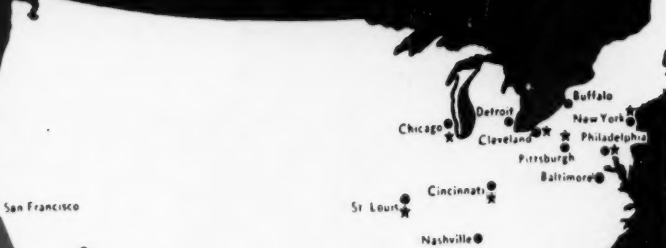
### SKF BALL & ROLLER BEARING PILLOW BLOCKS



*A complete*  
**COPPER and**  
**BRASS SERVICE**  
*for the*  
**SHEET METAL**  
**WORKER**



**HUSSEY**  
*PURE LAKE*  
**COPPER**



The nationwide availability of Hussey Pure Lake Copper steps up deliveries from days to hours . . . enables you to carry minimum copper inventories . . . gives you a complete selection of sheet and roll copper in all finishes for every sheet metal application as well as a complete line of copper roofing materials in all sizes and styles.

Let us help you get out that next job quickly and correctly.

**C. G. HUSSEY & COMPANY**  
*(Division of Copper Range Co.)*

Rolling Mills and General Offices: Pittsburgh, Pa.



**WAREHOUSE STOCKS IN THE  
 PRINCIPAL CENTERS**

*Copper* **HUSSEY** *Brass*

# THE AIRLINE REGISTER



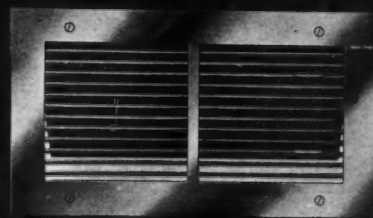
THE LINE THAT HAS  
*Everything!*

Air Conditioning Registers and Intakes, Gravity  
Registers and Intakes, Air Conditioning Grilles,  
Air Controls, Regulators.

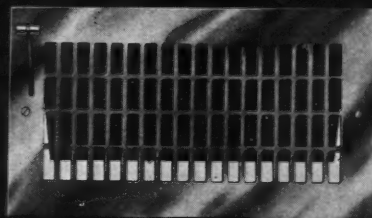


All a part of the **complete** Tuttle  
& Bailey line. Buy them **all** from  
this same source of supply and  
effect the economies resulting  
from concentrated purchasing.

CATALOG No. 39 IS READY!



THE FLEXAIR  
REGISTER



THE ECONOMAIR  
REGISTER

# TUTTLE & BAILEY

INCORPORATED

NEW BRITAIN,

CONN.

NEW YORK

CHICAGO

PHILADELPHIA



## "Give the Dealer Something He Can Make Money With!"

L. J. Mueller, Sr., when he founded the Company in 1857, laid down this simple rule about the relation of a manufacturer with his dealers. It was good 80 years ago and is still the best rule we know today.

Our engineering staff has pioneered a score of major improvements in the heating field in the past few years, and are ever on the alert to new improvements, design and applications.

When the market swung to automatic heat, we gave our dealers the Gas Era Furnace with the famous Heat-Speeder. And it still provides our dealers with a selling advantage. Next came gas, oil and coal-fired air condition-

ing units; fan-filter units and the sensational Mueller Oil Burner which operates on an improved and exclusive principle.

Add together all of these features, top them off with the most complete line in the industry, backed by intelligent advertising and sales promotion and you

can see why Mueller is the All-Star Line for 1939.

There are still some open territories — why not line up with the All-Star Line for '39 and take advantage of the Stars that Point the Way to Better Profits.

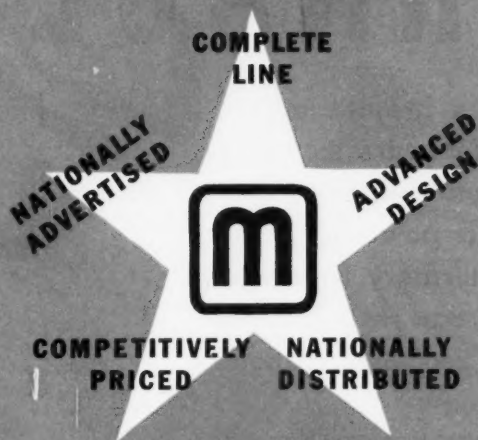
**L. J. MUELLER FURNACE COMPANY**  
2010 West Oklahoma Avenue, Milwaukee, Wisconsin

**MUELLER  MILWAUKEE**  
**HEATING AND AIR-CONDITIONING EQUIPMENT**

**THIS IS A MUELLER YEAR!**  
Get a head start on the rising building market by lining up with Mueller in 1939. New and patented designs in gas, oil and coal-fired furnaces, will give you an edge on competition.  
An all embracing line and a lively national advertising and merchandising campaign will help you secure a profitable share of the heating business. Watch Mueller in 1939. Because *This is a Mueller Year.*



# with MUELLER the ALL-STAR LINE for '39



## Mueller's All-Star Line means star performance for you in 1939

★ Concentrate your sales efforts on Mueller. The completeness of the line lets you in on any heating job. Offer your customers products that are known for quality, dependability and all 'round heating satisfaction.

★ And the Mueller line gives you all of these important advantages in a price range to meet individual needs and means.

★ Mueller has always provided their dealers with heating equipment that is up-to-the-minute in design and operation.

★ An engineering staff that is second to none assures you expert cooperation and advice in layouts, installations and applications, no matter the fuel used or the type of job.

★ Mueller advertising and sales promotion material is designed to help you sell. Mueller National advertising produces interested prospects for you.

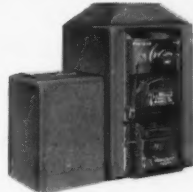
**Line up with the All-Star Line for '39**



Climatrol Gas-Fired  
Air Conditioning  
Furnace



Series 60 Oil-Fired  
Air Conditioning  
Furnace



Series "P" Fan-Filter-  
Furnace



Climatrol Junior  
Gas-Fired Air  
Conditioning Furnace



Mueller Eterno Furnace  
20-Year Written  
Guarantee



Series "CP" Gas-Fired  
Air Conditioning  
Furnace



Double Radiator  
Furnace



Muelleraire  
Forced Circulation  
Heater



Series "O" Oil-Fired  
Air Conditioning  
Furnace



Climator  
Fan-Filter Unit



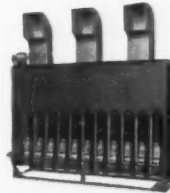
Series E-10 Gas-Fired  
Air Conditioning  
Furnace



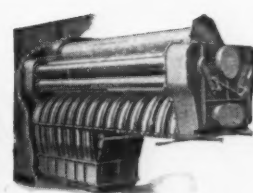
Steel Fan-Filter-  
Furnace



Full Front  
Furnace



Gas-Fired  
Unit Heater



Horizontal  
Tubular Furnace

# FOR COMPLETE SATISFACTION

## *Specify and Install*

# RYBOLT FURNACES



The famous Rybolt five-point cast-iron furnace combines beauty, quality, efficiency, strength and price in one low-priced unit.



The Series 600A7 Winter air conditioning unit. Quick response to firing, ease of cleaning and gas-tight construction are at their best in this model.



The Rybolt CBF Gas-fired air conditioning unit. Ideal for the modern home. Fully automatic, clean heat and ease of installation make it outstanding among air conditioning units.

When you specify and install a furnace or air conditioning unit you want to feel sure that you have given the best possible job to your customer. Customer recommendation is a powerful influence in your or anybody else's territory, and with a Rybolt furnace installed you can rest assured you'll get nothing but the finest recommendation.

Rybolt furnaces have over a quarter of a century of fine furnace building behind them and past performances prove them able to meet any heating condition.

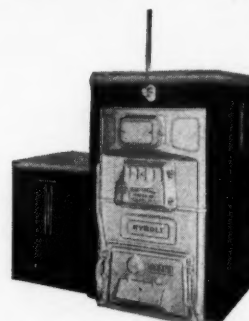
There is a unit for any situation you might encounter in selling the homeowner on the installation. For coal-fired jobs . . . the Series 600A7 with steel heating element or the Series 157 with the cast-iron furnace will afford perfect heat for any home. For FULLY AUTOMATIC HEAT neither of the two gas-fired units can be excelled and once installed you need never go back except for an occasional adjustment.

Give your customers complete, efficient, and economical installations and watch those orders flow in. Drop us a line today for literature and further information on the Rybolt line.

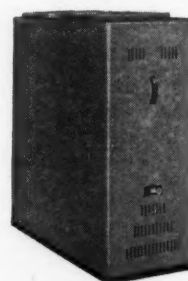
*Write Now for Literature!*



The Rybolt steel furnace. Scientific design coupled with Rybolt's famous construction make this furnace good for years of dependable heating.



The Series 157 Winter air conditioning unit which contains every important factor for clean, efficient, economical and trouble-free operation.



The new Rybolt gas-fired air conditioner. A unit which for compactness, automatic heat and reliable performance cannot be excelled.

**THE RYBOLT HEATER COMPANY**  
**ASHLAND, OHIO**



**TRANE**  
**AIR<sup>®</sup>**

**TRANE COOLING COIL**  
Available in a multitude of shapes, sizes, and types to fit any cooling requirement.

**TRANE ALL AROUND COIL**  
For steam or hot water heating, for cold water cooling and dehumidifying. Sized for job.

**TRANE COILS**



**ALL-ALUMINUM HEATING COIL**  
A thirty-pound weight saver made expressly for the China Clipper Ships.

**CIRCULAR COIL** —  
Protection Unit Heater, emphasizing complete flexibility of coil construction to solve air conditioning problems.

**LAUNDRY MACHINE DRYING COIL**  
Drying machinery manufacturers select Trane Coils for their long range service.

## COOLING OR HEATING — UNIT OR SYSTEM

You are going to find Trane Coils doing their work on jobs of every sort. The reason we picture 5 types of our coils here is this:

It is a fact of business that the advantage lies with the contracting company which has at its command the most adaptable and complete equipment for the installation job—plus the other great factor of manufacturers responsibility and the resultant recognition of the efficiency of his equipment.

It would be difficult to name any type of job in heating or cooling in all phases, where Trane Equipment has not been utilized. Trane has the name that sells confidence. Trane has the most complete line in the industry. Trane maintains for your benefit a staff of experienced men available for collaboration at more than 70 U. S. offices.

You will find the inclusion of Trane Equipment in your business of distinct assistance in selling a job. Trane recommends: "Buy Heating and Air Conditioning Through Your Architect — Engineer — Contractor." The Trane Company, 2007 Cameron Avenue, La Crosse, Wisconsin.



**TRANE**  
**AIR<sup>®</sup>**

THE TRANE COMPANY LA CROSSE, WISCONSIN

ALSO TRANE COMPANY OF CANADA LTD. TORONTO, ONTARIO.

Unit Heaters — Specialties — Convectors — Climate Changers — Cooling Coils — Unit Coolers — Blast Coils — Unit Ventilators



# WANT STEEL IN A HURRY?

## YOU CAN COUNT ON SCULLY SERVICE



**HERE'S A GOOD EXAMPLE  
OF SCULLY SERVICE**

Perhaps emergency orders are rare in your plant. Even so, it pays to get your steel from a source of supply that is both willing and equipped to meet emergencies such as this one:

12:30 at night — a breakdown occurs—in one of Cleveland's large industrial plants. Foreman calls our Cleveland Warehouse at once. Workmen quickly cut the needed bar of shafting.

All ready for the customer the same morning.

**Scully  
Service**

**T**RY as you will to keep ample stocks on hand, don't you, every once in a while, need steel in a hurry to keep production on schedule? That's the time to try Scully Service. When you tell us you're in a rush, we act accordingly. Your order is filled as fast as is humanly possible. Our respect for your emergency orders comes ahead of our respect for

quitting time and holidays. Scully "minute men" are always ready for your call.

For regular orders, too, call Scully. Each of our eight warehouses has a large stock of steel, steel products, copper and brass. Each one is equipped to handle your orders fully, promptly.

Send for our handy, complete Stock List and Reference Book. It's free, of course.

## SCULLY STEEL PRODUCTS COMPANY

*Distributors of Steel, Steel Products, Copper and Brass  
Warehouses at*

CHICAGO • NEWARK, N. J. • ST. LOUIS • BOSTON • ST. PAUL  
CLEVELAND • PITTSBURGH • BALTIMORE



# UNITED STATES STEEL



# SILENCE Sells VIKING BLOWERS

To the question "What Size Blower?" Viking has written a new answer. Within the past six months Viking has developed a formula that has resulted in a new series of blower designs which, size for size, give *more air* at *higher pressures* and with *less noise* than has ever before been possible. Performance requirements can thus be met with a smaller blower—at a considerable saving of cost and space.

## Furnace Manufacturers Find Viking Blowers More Efficient and More Quiet

Viking Engineers are designing blowers to meet many and varied needs. The following *actual cases\** from our files are typical.

**MANUFACTURER A** required abnormally high pressures, but was limited by space as to size of blower. At no extra cost Viking produced a special unit which answered perfectly and enabled him to dominate a highly competitive market with a superior product.

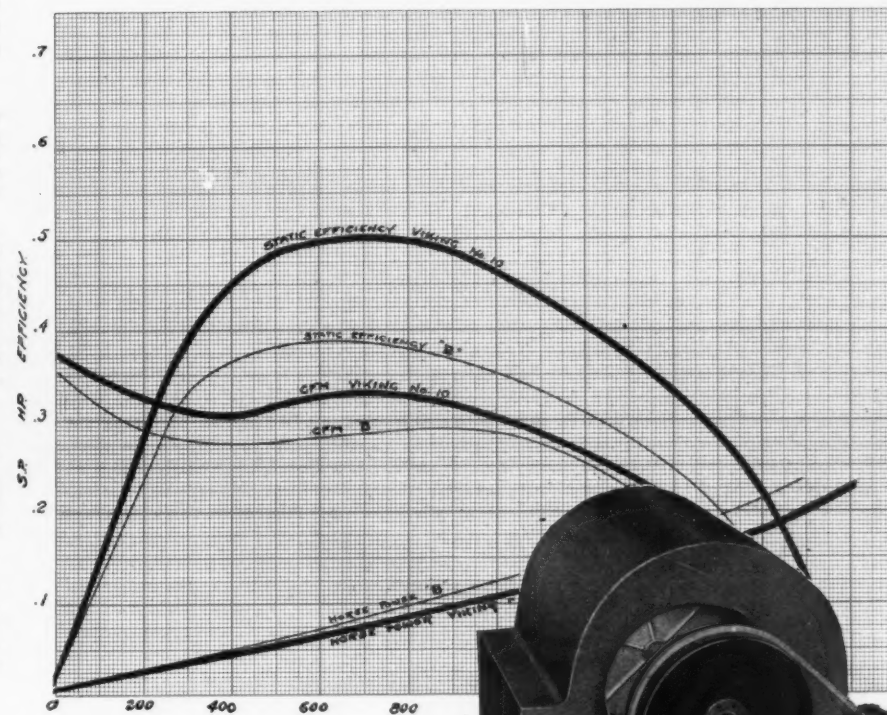
**MANUFACTURER B'S** furnace of unique design required blower and motor to fit in extremely limited space—with motor beneath blower. Need for extra-quiet performance and high pressure were further complications. Viking designed a simple, effective mounting, and, incorporating certain improvements in blower outlet, increased pressure, reducing power and noise.

**MANUFACTURER C** had been using 1/3 H.P. motor on popular size units for wide range of capacities. A Viking blower, properly adapted, showed such improvement in performance and efficiency that a 1/4 H.P. motor, which cost 1/3 less, provided ample power with a suitable margin of safety at full capacity.

**MANUFACTURER D** had a design consisting of sectional units, but whose volume requirements were moderate. Considerable savings in stock and cost were effected by employing Viking blowers in multiple, such as 1, 2 and 3 wheels on a single shaft.

\*Names upon request.

\*Chart Showing Performance of Viking Blower as compared with the competitive make second in performance.



\*Impartial tests made by a furnace manufacturer.

Make sure the air-conditioning unit you sell is equipped with a Viking blower. Viking also makes standard package units, humidifiers and attic fans—all Viking engineered for maximum efficiency. Send for information.

# VIKING AIR CONDITIONING CORPORATION

MAIN & CENTER STREETS, CLEVELAND, OHIO

# WE HAVE EVERYTHING



DISTRIBUTORS OF

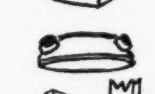
## NORCO PRODUCTS:



Asbestos Paper and Cement  
Ash Pans  
Ash Pit Doors  
Blowers  
Boiler Repairs  
Boiler Cleaning Compounds  
Boiler Grates  
Bonnets  
Broiler Pans—All sizes  
Brushes  
Casing Collars  
Cast Furnaces  
Cement  
C-I-C Enamel Cleaner  
Circulators  
Chain  
Chimney Cleanouts  
Chimney Tops  
Clinker Tongs  
Cook Stoves  
Copper Furnace Coils  
Dampers  
Doughnut Stoves  
Draft Adjusters  
Draft Regulators  
Elbows  
Fans  
Filters  
Fireclay  
Fireplace Dampers  
Fireplace Equipment  
Fireplace Grates  
Fittings  
Float Valves  
Floor Registers  
Flue Brushes  
Flue Scrapers  
Flue Stoppers  
Forced Air Fittings  
Furnace Brushes

Furnaces — (Norco Cast Steel, or Air Conditioning Unit)  
Furnace Check Dampers  
Furnace Cleaners  
Furnace Pipe & Fittings (Angles, Elbows, Galvanized Tees)  
Furnace Pokers  
Furnace Regulator  
Accessories  
Furnace Repairs  
Furnace Slicer Bars  
Furnace Tees  
Gas Burners  
Gas Cocks  
Gas Ranges  
Gas Range Repairs  
Grilles  
Heat Controls  
Hot Water Coils  
Hot Plates  
Hot Water Thermometers  
Humidifiers  
Industrial Gas Burners  
Kitchen Heaters  
Kreuter Pliers  
Laundry Stoves  
Mica  
Non-Con-Dux Asbestos Products  
Norco Furnaces (Cast, Steel & Air Conditioning Unit)  
Oil Circulators  
Oil Stoves  
Oil Stove Repairs  
Paints  
Porcelain Door Handles  
Furnace Vacuum Cleaners

Pokers  
Quadrants  
Registers & Register Faces  
Repairs for all Makes of Furnaces & Boilers  
Shovels  
Snips  
Soot Destroyers  
Springs and Clips  
Spring Handles  
Stove Boards  
Steel Furnaces  
Stove Cleaner  
Stove Knobs  
Stove Lid Lifters  
Stovepipe Collars  
Stovepipe Dampers  
Stovepipe Elbows (Corrugated and Adjustable)  
Stovepipe  
Stovepipe Tees  
Stovepipe Wire  
Stove Pokers  
Stove Polish  
Stove Putty  
Stove Repairs  
Stove Shakers  
Stove Urns  
Tank Heaters  
Tees  
Tinnars Red & Gray  
Tinnars Snips  
Tin Fittings  
Thermometers  
Turpentine  
Ventilators (Accurate)  
Water Pan Fillers  
Wire Drop Handles  
Wicks  
Wire



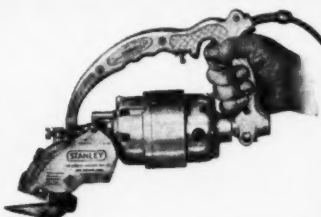
## NORTHWESTERN STOVE REPAIR CO.

Manufacturers of Stove, Furnace and Boiler Repairs  
662 WEST ROOSEVELT ROAD, CHICAGO, ILL.

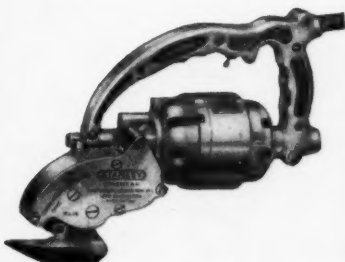




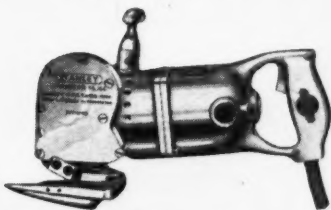
## PORTABLE UNISHEARS



"Mighty Midget" — Cuts up to 18 gauge hot rolled steel. Weight 7 lbs. Only \$54.00.

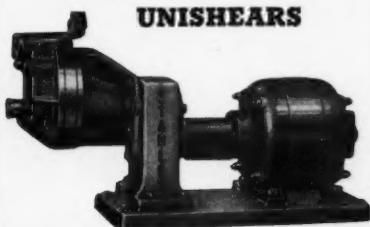


No. 16 — Cuts up to 16 gauge hot rolled steel. Weight 9¾ lbs. Only \$70.00.



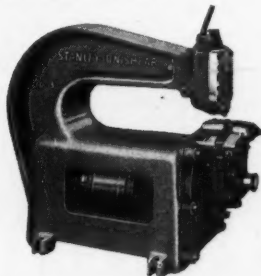
No. 144A — Cuts up to 12 gauge hot rolled steel. Weight 20 lbs. Only \$150.00.

## BENCH AND FLOOR UNISHEARS



No. A-14 — Cuts up to 14 gauge hot rolled steel. Can be mounted on bench or floor stand. \$172.00.

No. A-10 — Cuts up to 10 gauge hot rolled steel. Easily mounted on bench or floor stand. \$315.00.



No. O-15 — Cuts up to 14 gauge hot rolled steel. Cut may be started from either the edge or inside of the sheet. Minimum radius of cut ¼ inch. \$325.00. Also available with 36" and 54" throats.

Write for free folder containing complete data.



## CUT SHEET METAL *Any Pattern*

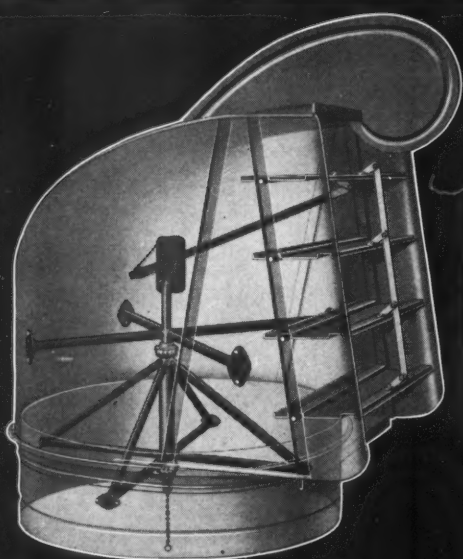
Whether your job is in the shop or in the field . . . cutting light sheet metal or heavy boiler plate . . . you can do it better and faster, at lower cost with one of the motor-driven Stanley Unishears. These shears cut curves, angles, notches, even intricate shapes leaving a smooth, clean edge.

Ask your Stanley dealer to show you the advantages of these cost-cutting shears right on your work . . . without obligation. Or write for literature. Stanley Electric Tool Division, The Stanley Works, 131 Elm Street, New Britain, Connecticut.

# STANLEY UNISHEARS

THE ELECTRICALLY DRIVEN HAND SHEARS

# *Correct Design in Ventilators Essential Today*

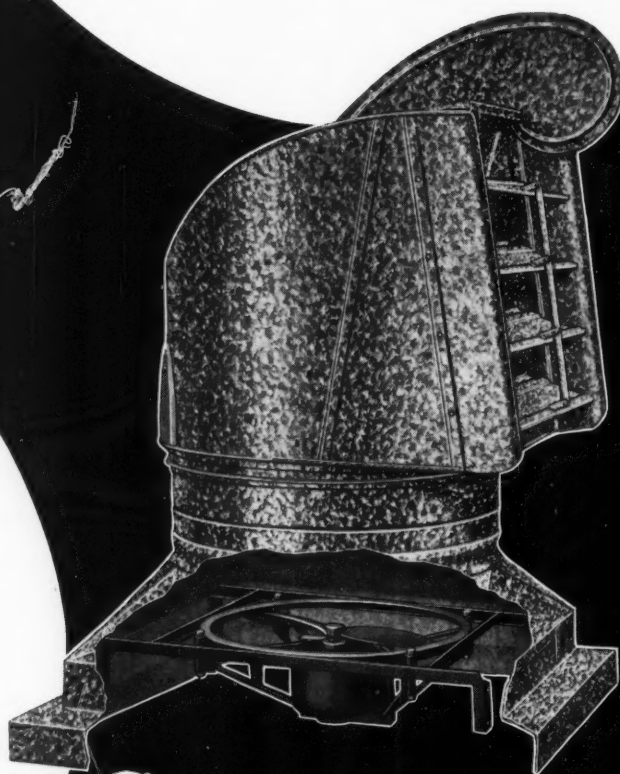


## **Swartwout ROTARY BALL BEARING VENTILATOR**

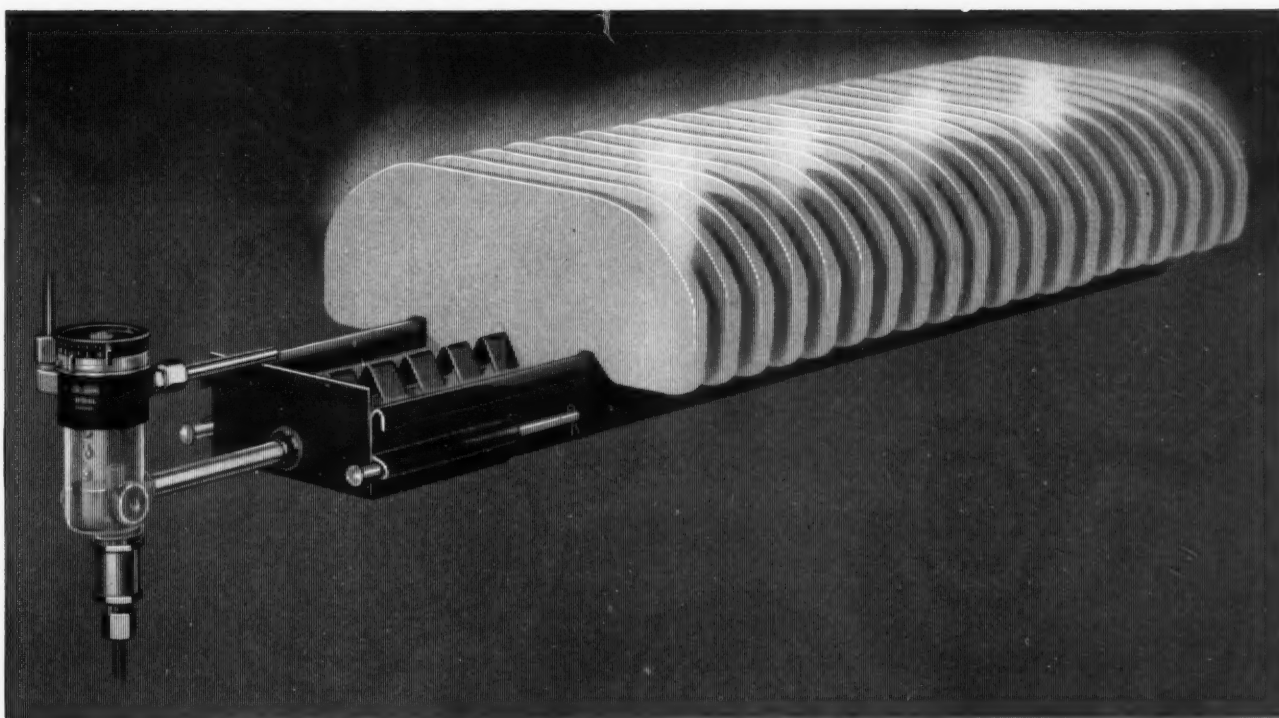
Ventilator Efficiency and Capacity depends upon correctness of design. The Swartwout Rotary (the original rotary ventilator) delivers greater capacity because it is basically correct in design. *Its overall diameter is approximately same as throat opening.* Compare this with other types of round ventilators. Use the Swartwout Rotary for real economy and satisfaction.

The Swartwout AirJector is the Swartwout Rotary with a high efficiency fan installed in the base. *Discharge is always with the wind*—thus securing greater capacity with less power. Write for bulletin.

**THE SWARTWOUT COMPANY**  
18615 Euclid Ave., Cleveland, Ohio



## **Swartwout AIRJECTOR** Name Registered U.S. Patent Office



# MONMOUTH HUMIDIFICATION

*Meets Every Requirement  
of Furnace Manufacturers*

- 1.** Adequate evaporating capacity in compact space. Modern design and low bonnet clearances need not handicap humidification capacity.
- 2.** Most complete range of sizes to scientifically fit the smallest or largest furnaces and conditioners. No problem is too difficult for Monmouth.
- 3.** Five interchangeable control methods—simple, low-priced manual control, float control, fully automatic weather—graduated control at furnace or from rooms.
- 4.** Extensive price range to meet any condition starting with low priced system for competitive furnaces on up to fully automatic system for de luxe conditioners.

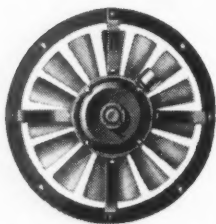
*Six years of development research assures you that Monmouth Humidification is RIGHT. For complete information address Monmouth Products, Inc., 1933 E. 61st, Cleveland, O.*

**AUTOMATIC**  **JUNE**  
GRADUATED HUMIDITY CONTROL

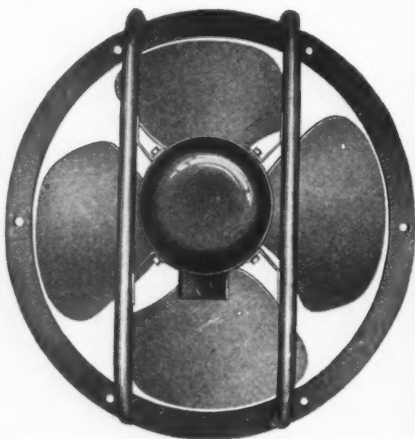


# Peerless AIR CONDITIONING PRODUCTS

## FANS



A PEERLESS Multiple Blade Exhaust Fan—direct drive—with silent capacitor motor—variable speeds—supplied with either 16, 18, 24, or 30 inch diameter fan.

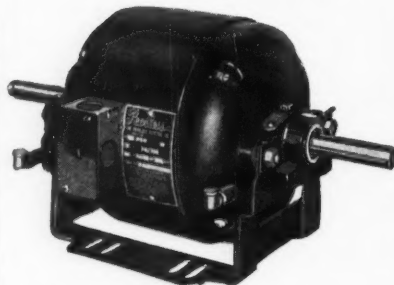


A PEERLESS Four Blade Ventilating Fan in a modern new design—direct drive—can be supplied with either 16, 18, 24, or 30 inch diameter fan.

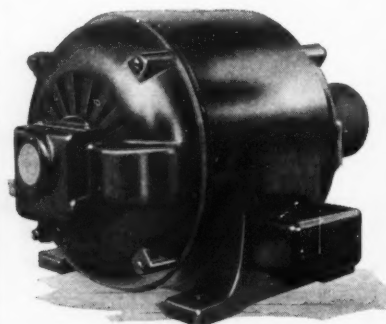


A PEERLESS Multiple Blade Belt Drive Fan in a new design—supplied with either 24 or 30 inch diameter fan.

## MOTORS

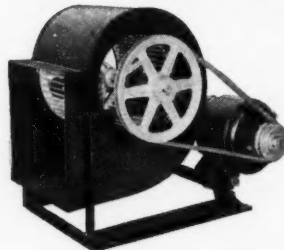


A PEERLESS Single Phase Motor with extended shaft—long life and wool-packed bearings—recommended for fans and blowers.

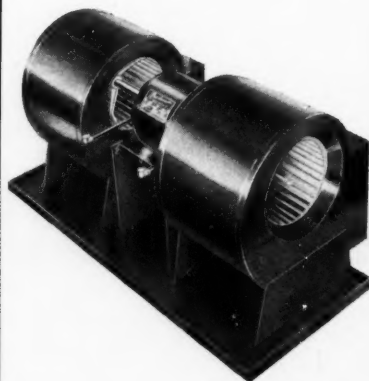


PEERLESS Squirrel Cage Induction Motors are favored by machinery manufacturers for their reliability, super-performance, and fine appearance.

## BLOWERS

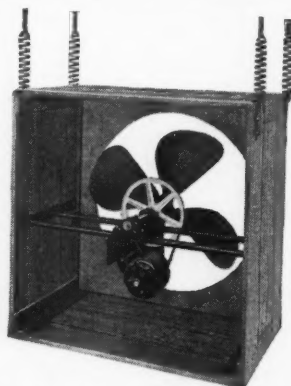


PEERLESS Belt Drive Blowers may be had complete, with or without motors. Blower wheels, scrolls and bearings may be ordered separately.



PEERLESS Direct Drive Panel Units can be supplied for either vertical or horizontal mounting—with or without cabinet and filters.

## ATTIC FANS



A PEERLESS "Ventilattic" Fan with coil spring suspension, thermal protected motor and automatic belt tension device.



PEERLESS Package units—either Belt Drive or Direct Drive can be used with new or old furnaces—they are attractive, quiet and compact.

## THE PEERLESS ELECTRIC COMPANY

Representatives  
in Principal Cities

1939 West Market Street  
WARREN, OHIO

West Coast Representative  
MONTGOMERY BROTHERS  
61 Fremont St., San Francisco, Cal.

*"For 45 years—only the best"*

# Make the FITZGIBBONS COMPLETE LINE YOUR TICKET TO 1939 AIR CONDITIONING profits!

With this varied list of air conditioning units. Whether it's conditioning one room, or an entire home — winter conditioning or summer cooling too — oil, gas or coal as fuel — top-notch quality, or the price question to the fore . . . with the Fitzgibbons line you have the right answer, every time.

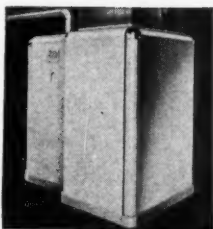
LOOK THEM OVER — THEN ACT!

## SPLIT-SYSTEM CONDITIONERS



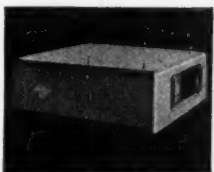
### THE BOILER-AIRCONDITIONER

Gives filtered, tempered, humidified air for selected rooms, economical steel boiler radiator heat for other rooms (such as kitchen, bath, garage) and year-round domestic hot water. A complete unit with any oil burner, gas burner, stoker.



### THE FITZGIBBONSAIRE

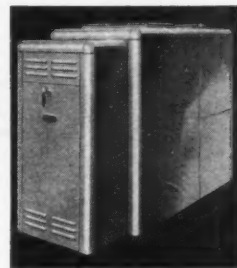
Is designed as a companion unit with the Fitzgibbons steel boiler. May be installed without regard to boiler location. Provides filtered, tempered, humidified air for selected rooms.



### THE FITZGIBBONSAIRE, Jr.

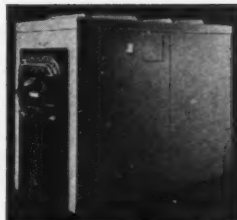
A smaller unit, works with any Fitzgibbons steel boiler, and conditions air for one or two rooms only or similar limited service. Inexpensive installation, and popular for adding conditioning in existing homes.

## DIRECT-FIRED CONDITIONERS



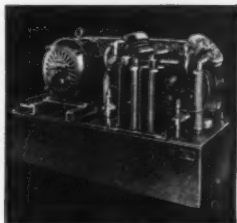
### THE DIRECTAIRE

A steel furnace unit with outstanding efficiency, ease of cleaning, quietness, fuel-saving. Made in all required capacities, easy to install. Works with any type of oil or gas burner or stoker.



### THE "SPECIAL-80" DIRECTAIRE

A direct-fired conditioner with the same high quality Fitzgibbons construction and material throughout, but designed, sized, and priced especially for the small home. Recognized as a big step forward in vastly broadening the conditioner market.



### SUMMER COOLING

THE FITZGIBBONS COOLING SYSTEM comprises a complete line of compressors adaptable for the addition of summer cooling to any Fitzgibbons conditioner. This addition may be made when conditioner is installed, or at any time thereafter.



FITZGIBBONS BOILER COMPANY, INC.  
101 Park Ave., New York, N. Y.

AA-1

Send me full details about the Fitzgibbons line of Air Conditioners and about the Fitzgibbons Authorized Dealer Franchise.

Name.....

Address.....

# WISS TINNERS SNIPS

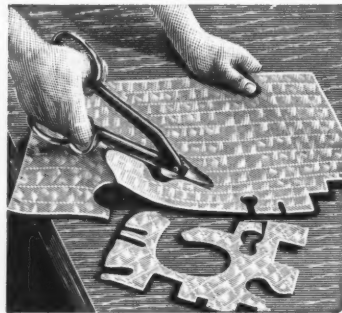
**BEST BY ACTUAL TEST**

**PRECISION GROUND—ACCURATELY TEMPERED—FACTORY TESTED**  
**"HIGH-POWER" SNIPS WILL CUT ALLOY METALS**

## WISS SCROLL- PIVOTER SNIP

Cuts circles, scrolls, and squares as easily as a straight line.

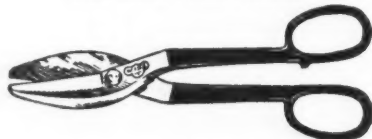
Here's a sensational new snip, the exclusive features of which cannot be appreciated until you have actually cut with it. No other form-cutting snip will do a quicker or better job—in fact, the pivoting principle of this new snip enables it to cut intricate shapes with an incredible ease that no other snip can equal. It will cut ordinary galvanized sheets up to 18-gauge, and Monel Metal sheets of average thickness. Now furnished with one blade serrated unless otherwise ordered.



| Number | Length | Finish              |
|--------|--------|---------------------|
| 9X     | 12 in. | Dull Gray<br>Nickel |

## REGULAR PATTERN TINNERS' SNIPS

Inlaid Crucible Steel Blades  
Gun Metal Finish Handles



"High Power" Snips Marked \*

| Number | Full Length | Length of Cut | Number  | Full Length | Length of Cut |
|--------|-------------|---------------|---------|-------------|---------------|
| 13     | 7 in.       | 2 in.         | * 9     | 12 1/2 in.  | 3 in.         |
| 12     | 8 in.       | 2 in.         | * 8     | 13 3/4 in.  | 3 1/2 in.     |
| 11     | 9 1/2 in.   | 2 1/4 in.     | * 7     | 14 1/2 in.  | 4 in.         |
| *10    | 11 1/2 in.  | 2 1/2 in.     | * 6 1/2 | 15 3/4 in.  | 4 1/2 in.     |

## COMBINATION PATTERN TINNERS' SNIPS

Inlaid Crucible Steel Blades  
Will cut circles as well as straight lines



| Number | Full Length | Length of Cut |
|--------|-------------|---------------|
| *100   | 11 1/2 in.  | 2 1/2 in.     |
| * 19   | 12 1/2 in.  | 3 in.         |
| * 18   | 13 1/2 in.  | 3 1/2 in.     |
| * 17   | 14 1/2 in.  | 4 in.         |

## CURVED BLADE PATTERN TINNERS' SNIPS

Inlaid Crucible Steel Blades



| Number  | Full Length | Length of Cut | Number     | Full Length | Length of Cut |
|---------|-------------|---------------|------------|-------------|---------------|
| 11 C.B. | 9 1/2 in.   | 2 1/4 in.     | 8 C.B.     | 13 3/4 in.  | 3 1/2 in.     |
| 10 C.B. | 11 1/2 in.  | 2 1/2 in.     | 7 C.B.     | 14 1/2 in.  | 4 in.         |
| 9 C.B.  | 12 1/2 in.  | 3 in.         | 6 1/2 C.B. | 15 3/4 in.  | 4 1/2 in.     |

## "NU-GRIP" SNIPS

With or Without Springs

WONDERFUL CUTTERS

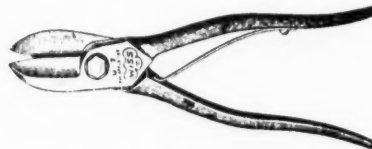
EASIER TO USE



## COMBINATION PATTERN

For Curved, Irregular and Straight Work  
This Combination or Scroll Nu-Grip Snip with spring will cut curves, circles and irregular work faster, neater and easier than any other snip of its type. For use on templates, fixtures and metal pattern work. Furnished in two sizes.

| Number    | Length    |
|-----------|-----------|
| U C-8     | 8 in.     |
| U C-9 1/2 | 9 1/2 in. |



## REGULAR PATTERN — For Straight Work

The Straight pattern Nu-Grip Snip, equipped with spring, is the finest and fastest tool of its size for straight cutting on metal—much easier to operate. Furnished in two sizes.

| Number  | Length    |
|---------|-----------|
| U-7     | 7 in.     |
| U-8 1/2 | 8 1/2 in. |



## NEW BULLDOG SNIP FOR HEAVY DUTY

Precision Ground, Inlaid Crucible Steel Blades  
Short Powerful Jaws and Long Handles  
Give Wonderful Leverage  
Made in Two Lengths

| Name     | Length | Length of Cut |
|----------|--------|---------------|
| *Bulldog | o/a    |               |
| *Bulldog | 17 in. | 2 1/2 in.     |
|          | 14 in. | 2 1/2 in.     |



## LIGHT METAL SNIPS No. J-7

With Curved or Straight Blades

This handy Snip is the best known and most universally popular type used for light metal work, by electricians, tinsmiths, plumbers, jewelers, dental workers and wherever light metal templates or patterns are required to be cut. It is light — strong — easily handled — made of fine tool steel, accurately tempered, and is ideal for all-purpose light work. It is a surprisingly powerful cutter.

| Number | Length | Cut       |
|--------|--------|-----------|
| J-7    | 7 in.  | 1 1/4 in. |

**J. WISS & SONS CO., NEWARK, N. J.**

LEADERS SINCE 1848





**NO EXTRA COST  
FOR THIS ADDED  
MOTOR  
PROTECTION**

**Reduce Expensive  
Service Calls . . . Make  
Friends for your Products**

**NEW *Century*  
INSULATION REDUCES  
ELECTRICAL BREAK-  
DOWNS CAUSED BY  
DAMPNESS**

**CALL A  
*Century*  
MOTOR  
SPECIALIST**

Atlanta • Baltimore • Boston  
Buffalo • Chicago • Charlotte  
Cincinnati • Cleveland • Dallas  
Denver • Davenport • Detroit  
Indianapolis • Kalamazoo  
Houston • Kansas City • Los  
Angeles • Milwaukee • New York  
Minneapolis • New Orleans  
Omaha • Philadelphia • Pittsburgh  
Rochester • Salt Lake City • Tulsa  
San Francisco • Spokane • Seattle

Century has developed a new insulation process to prevent moisture and dampness from soaking into the insulation and causing motor breakdowns. . . . This has a special value—in the summer when the motor “sweats,” because it isn’t running and therefore hasn’t a chance to dry itself out.

This exclusive treatment, developed by Century Engineers, resists moisture absorption—cements coils together—prevents “chafing” between wires—resists mechanical abrasion—is thin enough to properly radiate heat.

Make friends for your product—eliminate sources of complaint—dissatisfied customers—expensive service calls—and costly loss of time.

Now—when you are planning your 1939 models—call a Century Motor Specialist and have him explain how—at no greater cost—you can get greater motor value!



**CENTURY ELECTRIC COMPANY**

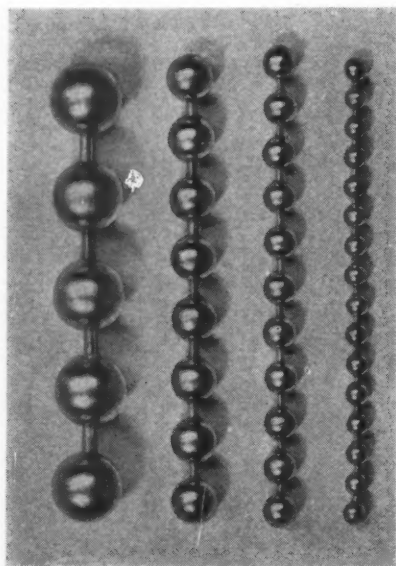
1806 Pine Street

St. Louis, Mo.

Offices and Stock Points in Principal Cities

**ONE OF THE LARGEST EXCLUSIVE MOTOR MANUFACTURERS IN THE WORLD**

# BEAD CHAIN\*



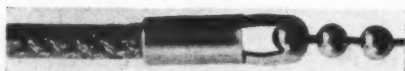
No. 20  
BEAD  
CHAIN      No. 13  
BEAD  
CHAIN      No. 10  
BEAD  
CHAIN      No. 6  
BEAD  
CHAIN

Illustrations Actual Size  
Samples on Request

| Size No. | Dia. of Bead<br>in Inches | Approx. Tensile<br>Strength in pounds |
|----------|---------------------------|---------------------------------------|
| 6        | .125                      | 25-30                                 |
| 10       | .187                      | 45-50                                 |
| 13       | .250                      | 85-100                                |
| 20       | .375                      | 175-200                               |

## MATERIALS

Brass, Bronze, Gilding Metal, Nickel Silver, Aluminum; Chromium, Nickel, Gold and Silver Plate. Standard attachments as shown, or made to customers' specifications.



## CHAIN AND CORD COUPLING (Actual size)

This coupling, No. 10-V, makes a firm detachable connection between BEAD CHAIN and Venetian blind or sash cord. It is easily applied. For No. 10 BEAD CHAIN only.

\*Trade Mark Reg. U. S. Pat. Off.

The non-kinking and swiveling characteristics of BEAD CHAIN\* make it advantageous for use in regulator adjustments.

BEAD CHAIN\* adds but little to the cost of any heating or ventilating unit and greatly improves the appearance and operation of the finished job.

BEAD CHAIN\* is adapted to sprockets that have been designed for the automatic regulation of dampers and ventilators, that work smoothly and efficiently.

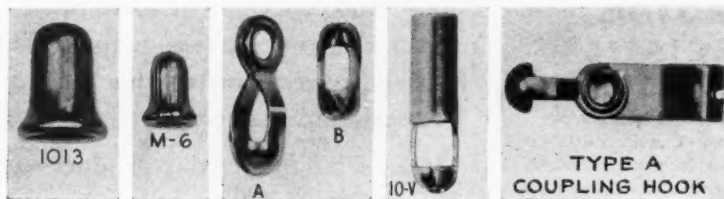
BEAD CHAIN\* may be had in bulk and cut lengths, with couplings and attachments, or in assemblies to meet the specifications of the manufacturer.

BEAD CHAIN\* engineering service is prepared to cooperate fully with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

## DETACHABLE PENDANTS

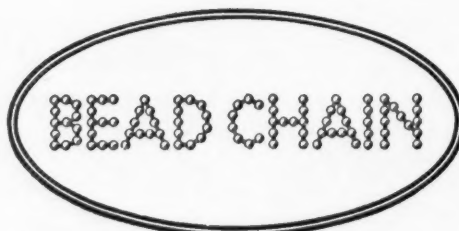


## NON-DETACHABLE PENDANTS



## COUPLINGS

TYPE A  
COUPLING HOOK

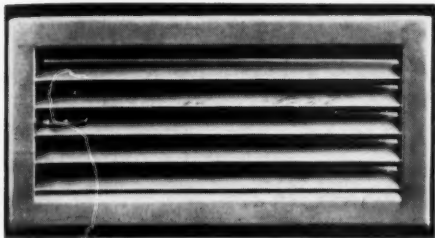


Trade Mark Reg. U. S. Pat. Off.

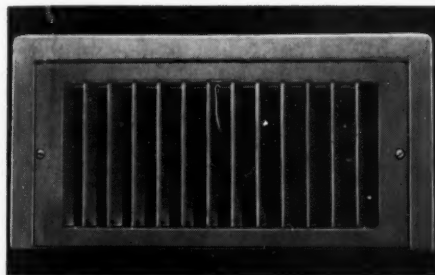
**THE BEAD CHAIN MANUFACTURING CO.**  
**BRIDGEPORT** **CONNECTICUT**

# WATERLOO

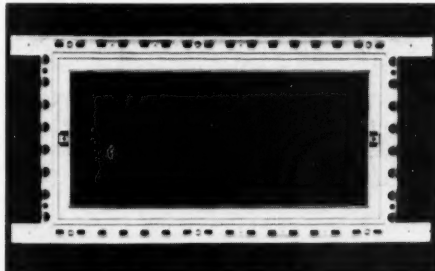
## REGISTERS *for 1939*



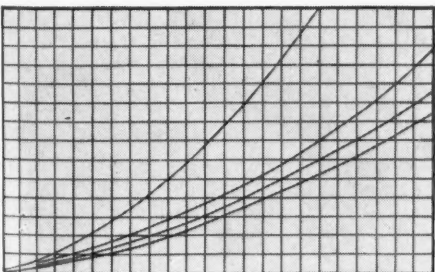
FH-100. Adjustable one-piece Venetian Type Register for walls.



F-204. Two-piece adjustable Register for baseboards.



VEE-U FRAME. Patented. Assures positive, tight connection with stackhead.

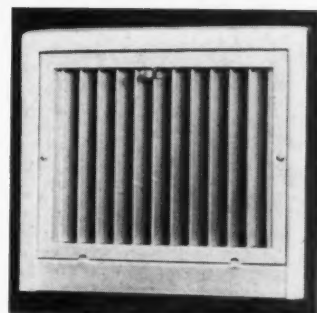


Helpful charts and installation data are given in the new Waterloo catalog. Write for free copy.

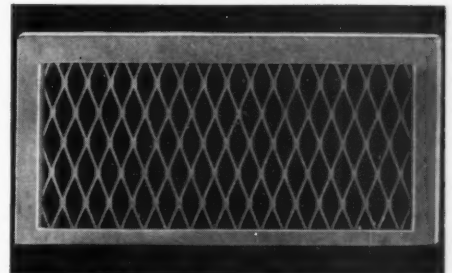
*Bringing **NEW** Features  
and **NEW** Economy  
for every installation*

**T**HE complete Waterloo line now assures you more extra features and extra value to increase your business and profits for 1939. • Here are a few of the exclusive advantages you get with Waterloo Registers for air conditioning . . . Multi-louvre control at the price of single valve control; supply registers and grilles furnished with gaskets attached, at no extra cost; matched design, with intakes to match supply registers; exclusive "Venetian" type design; and many other features.

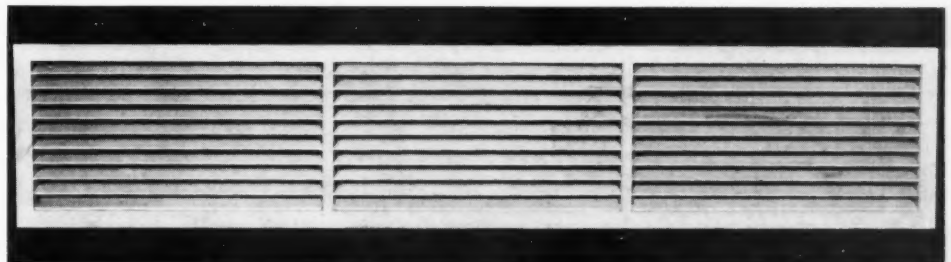
Waterloo also offers a complete line of gravity registers, floor and ceiling registers, and ornamental steel grilles — all with sales-winning advantages that mean more profits for you.



No. 400. Two-piece Gravity Register with adjustable vertical multi-louvers.



X-1. Baseboard intake with 16-gauge face welded solidly in base frame.



FHG-O-45. Distinctive Venetian Blind Type Return Grille with louvers at 45° to screen duct work in back of grille.

*Free Catalog*

Reach out for a bigger, more profitable market in 1939. Send for your Free copy of the Waterloo catalog which gives complete details on the money-making Waterloo line.

**WATERLOO REGISTER CO**

Waterloo, Iowa

Seattle, Wash.



# Repair parts

FOR ALL  
HEATING UNITS

Carried in STOCK and ready for IMMEDIATE SHIPMENT. All parts GUARANTEED to FIT and our prompt service will help you make a profit on that repair job.

We also carry a complete line of FURNACE FITTINGS, PIPE, REGISTERS, FILTERS, BLOWERS, CONTROLS, ASBESTOS, etc.

Send for our Order Book and Literature.

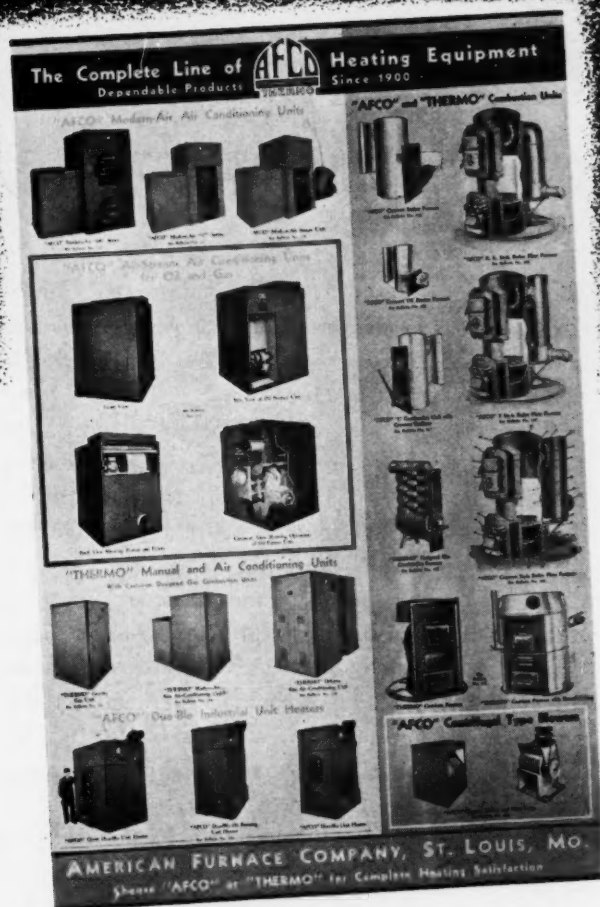


**A. G. BRAUER SUPPLY CO.**

**316 North Third St.**

**St. Louis, Mo.**

# Chart Your Profits for 1939 with "AFCO"



Have you revised your plan of operation to match the rapidly changing conditions in the heating industry?

Don't let the competition of the fuels catch you on the limited side of one or the other. Be prepared to offer a complete heating service. It is the sure way to chart your business plans for a successful 1939.

This wall chart, illustrating the complete line of "AFCO" and "THERMO" Equipment, is the sales and profit guide for hundreds of progressive heating-service merchandisers. It tells at a glance, the graphic story of "AFCO" progress to provide a perfectly balanced line of equipment for all fuels—for all price brackets.

## A Complete Line of Air Conditioning Heating Equipment for Automatic Oil—Gas and Stoker, and Manual Solid Fuel Operation

Avoid the hazard of installing unknown or transient heating units. Standardize on nationally known "AFCO" and "THERMO" Furnaces, Blowers and Complete Units for all fuels. The experience and engineering skill resulting from 38 years in the manufacturing of quality heating equipment is your guarantee of customer satisfaction.

### Sell Both Markets

An enormous modernization market, for air conditioning heating equipment, has barely been scratched. With "AFCO" units you can capture this profitable business, whatever the requirements. The new-home field is a challenge to your merchandising skill. Be prepared with competitively priced equipment that

meets architectural and engineering specifications for efficiency, and home builders' favor for smart appearance and economy.

### Send for Your Chart Today

Get a copy of this 25 in. x 38 in. wall chart attractively illustrating, in color, the complete line of "AFCO" Equipment. Remember, each of the models is available in a range of sizes. For complete information ask for Bulletins giving specifications and performance data.

There are still many desirable territories available for Wholesale Distributors and Installers. Don't make any decision for 1939 until you have fully investigated the exclusive advantages of the "AFCO" Franchise. Use the handy coupon.

**AMERICAN FURNACE CO.**  
2719-31 DELMAR BLVD.  
ST. LOUIS, MO.

*Manufacturers of Quality Heating Equipment  
Since 1900.*

|   |  |                     |
|---|--|---------------------|
| AMERICAN FURNACE CO.  |  | AIR COND. DIV. A.A. |
| 2719-31 DELMAR BLVD., ST. LOUIS, MO.  |  |                     |
| <input type="checkbox"/> Send Wall Chart<br><input type="checkbox"/> Send Bulletins and complete price information, without obligation. |  |                     |
| Name .....  |  |                     |
| Address .....   |  |                     |
| City .....  |  | State .....         |
| Signed .....  |  |                     |

# The Public

IS ACQUIRING

## A NEW APPRECIATION OF ANTHRACITE



The current Anthracite Industries, Inc., advertising tells a most dramatic and easily understood story of Anthracite's advantages. Evidence is accumulating in the whole Anthracite market, to prove that the public is acquiring a new appreciation of Anthracite.

The campaign carries convincing evidence. It points out that Anthracite provides all 7 essentials to complete heating satisfaction. It demonstrates how the householder must sacrifice some of Anthracite's advantages if he desires to use any other fuel.

The campaign is reaching more people, in more places than ever. Advertisements are appearing in 72 newspapers, with more than 10,000,000 circulation and several times as many readers, reaching every city, town and village of the primary Anthracite markets. In addition, it is spreading out into new areas—to tell new users the advantages this 7-star fuel can offer.

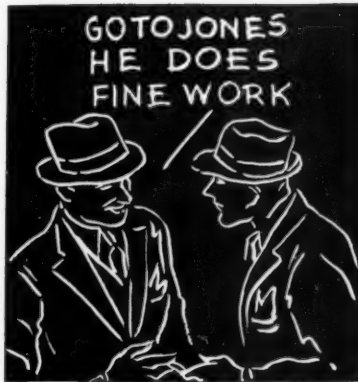
This extensive advertising effort is for the direct benefit of the heating contractor. Many contractors are advertising their services on the same page with advertising of Anthracite Industries, Inc. Many others are advertising the modern equipment they sell and install. Increased business is being created both in modernizing existing heating plants and for new installations. Anthracite Industries, Inc., Chrysler Building, New York City.



This Seal of Approval appears on Anthracite equipment only after it has passed rigid tests.

Save with  
**ANTHRACITE**  
(HARD COAL)  
THE ONLY 7 STAR FUEL





*Which Brings You  
More  
Business*

# PRAISE or COMPLAINTS?

... Praise, of course! Praise from the architect, the general contractor, the building owner!

If you appreciate the true value of this testimonial advertising of your own work, you will not be tempted to install equipment "just as good" in order to make a larger temporary profit on any one job.

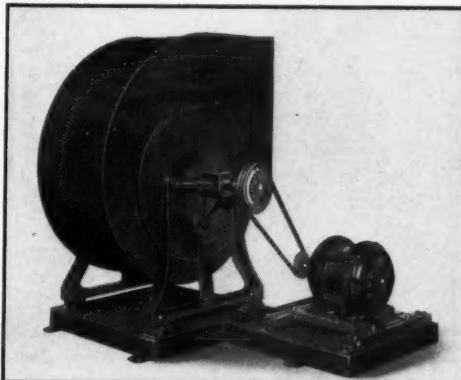
You will be sure that your fans and air conditioning units measure up to the highest engineering standards—that they will operate quietly and efficiently for many years without repairs or breakdowns.

Buffalo "Tailor-Made" units offer you that kind of performance—the only kind that really counts for YOU in the long run.

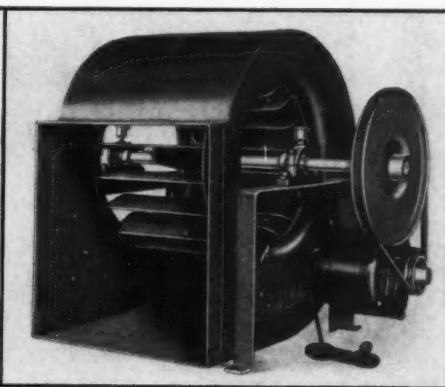
*Write for literature today.*

**BUFFALO FORGE COMPANY**  
497 BROADWAY BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities  
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

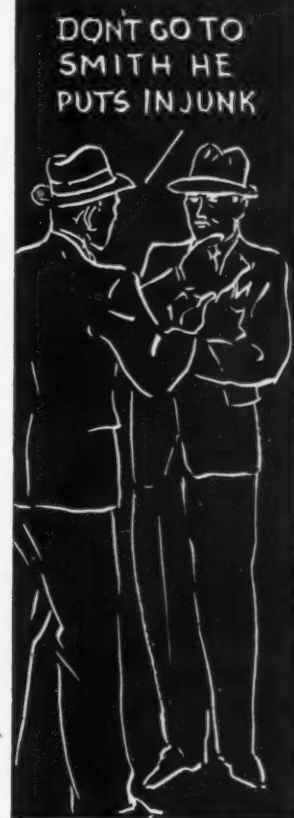


**LIMIT-LOAD FANS** complete with motor and silent floating base—for those big ventilating and air conditioning jobs. Save much layout and erection expense.



**H. V. A. FANS**—The truly quiet and highly efficient fan for your forced warm air heating work.

**COMFORT CONDITIONING**—A compact commercial unit that will handle every job from simple cooling to complete air conditioning and heating. The year 'round unit.





... to insure complete  
customer satisfaction  
and increased profits  
in 1939, select



### REX AIR-PAK with the "Patrol Modulator"

Now, you can give the low income group complete, automatically controlled, winter air conditioning at a price near the conventional single speed blower. The Junior REX AIR-PAK with the new "Patrol Modulator" regulates the fire in the furnace and the flow of air from the blower automatically. This system of control replaces the room thermostat, furnacestat and damper motor—at a much lower cost. Get complete information.

With so many home owners installing winter air conditioning, it's just good business to sell equipment that will give satisfied customers and as a result more sales. For years REX AIR-PAK has been supplying blowers and blower filter units to furnace manufacturers and contractors whose specifications permit only the best. Play safe—select REX AIR-PAK for 1939, the line that is complete, and which is priced to give the home owner the maximum value for his money, and to enable the dealer to meet competition on a profitable basis.



**Junior Models:** Designed for home renters and home owners of limited income. Completely assembled, ready to install. Made in two sizes—Jr-100; Jr-120—with a wide range of capacities. Top mounted  $\frac{1}{4}$  h. p. motor; large filter area; deep throat eliminates furnace boot. Four speed pulley. Several colors.



**Rival Models:** You can please your customers and outsell competitors with the new Rival models. Five sizes—No. 130, No. 140, No. 160, No. 180, No. 200. Top mounted motor on the No. 130 and No. 140; rear mounted on the larger models. Slip-joint casing, easily and quickly assembled. Four speed pulley. Several colors.



**With Automatic Louvres:** The louvres automatically open and close instantly as the blower starts and stops. This principle provides gravity circulation when the blower is not running, delivering the same amount of air as do other blowers at their low speed. Can also be furnished without louvres.

#### SEND THIS COUPON FOR COMPLETE DETAILS

Air Controls, Inc.

Div. of the Cleveland Heater Co.

1933 West 114th, Cleveland, Ohio

☐ REX AIR-PAK ☐ BLOWERS ☐ PARTS

Name .....

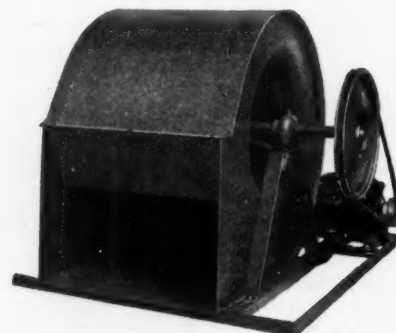
Address .....

City ..... State .....

A. A. 1-39

#### REX A C Blowers and Accessories

Whatever your blower needs may be, we can meet them successfully and economically. REX A C Blowers are available in single and twin styles, in any position of discharge. Top or rear motor mounting. For furnace manufacturers who buy wheels, housings, etc., we can meet any quantity requirements.



# SUPERIOR SNIPS

FOR EVERY TYPE OF SERVICE

**CIRCULAR CUTTING SNIPS** . . . No. T412  
Length, 12-1/2"; cut, 3"; Price, \$1.75. Also 7" size, No. 147, \$1.10

**STANDARD TINNERS' SNIPS** . . . No. 5411  
Length, 11"; cut, 2-1/2"; Price, \$1.25. Eight sizes in all, 7 to 14".

**COMBINATION CUTTING SNIPS** . . . No. U412  
Length, 12-3/4"; cut, 3"; Price, \$1.75. Cuts curves and straight.

**HEAVY DUTY SNIPS**  
No. U416 . . . Length, 18-1/4"; cut, 2-3/4"; Price, \$3.00. Cuts curves and straight.

## CRESCENT and Smith & Hemenway TOOLS





# Famous TRADE MARKS ON STEEL SHEETS

Since 1920 the Superior Sheet Steel Company has specialized in coated sheets. As metallurgy and methods of manufacture have advanced, SUPERIOR has kept pace by research and experience. Notable examples are SUPERIOR Galvanized and SUPERIOR Galvannealed sheets. The former have been developed to a high degree of perfection in workability and temper of the steel sheet itself as well as in uniformity and protective value of the zinc coating. SUPERIOR Galvannealed is pre-eminently the first choice in industries where coated sheets must meet highly specialized requirements.

It has always been the policy of SUPERIOR to offer steel sheets of maximum value . . . sheets that give the greatest economy through all steps of fabrication, finish and actual use in the hands of sheet metal workers or manufacturers. To attain this objective, SUPERIOR has developed a wide range of sheets, each with specific properties — analyses, tempers, finishes and coatings, under five famous trade marks. Users are thus provided an opportunity to select steel sheets on the basis of the qualities they desire to build into their products, and at the same time enjoy the economies that come from the high degree of uniformity and workability of these sheets.

SUPERIOR Sheets have not only been profitably employed in varied industries but in a number of cases have been the accepted standard over a period of many years. SUPERIOR engineers are always glad to lend their experience and counsel for the better solution of problems involving the choice and use of coated sheets.

**THE SUPERIOR SHEET STEEL CO.**

CANTON, OHIO

Division of Continental Steel Corp., U. S. A.

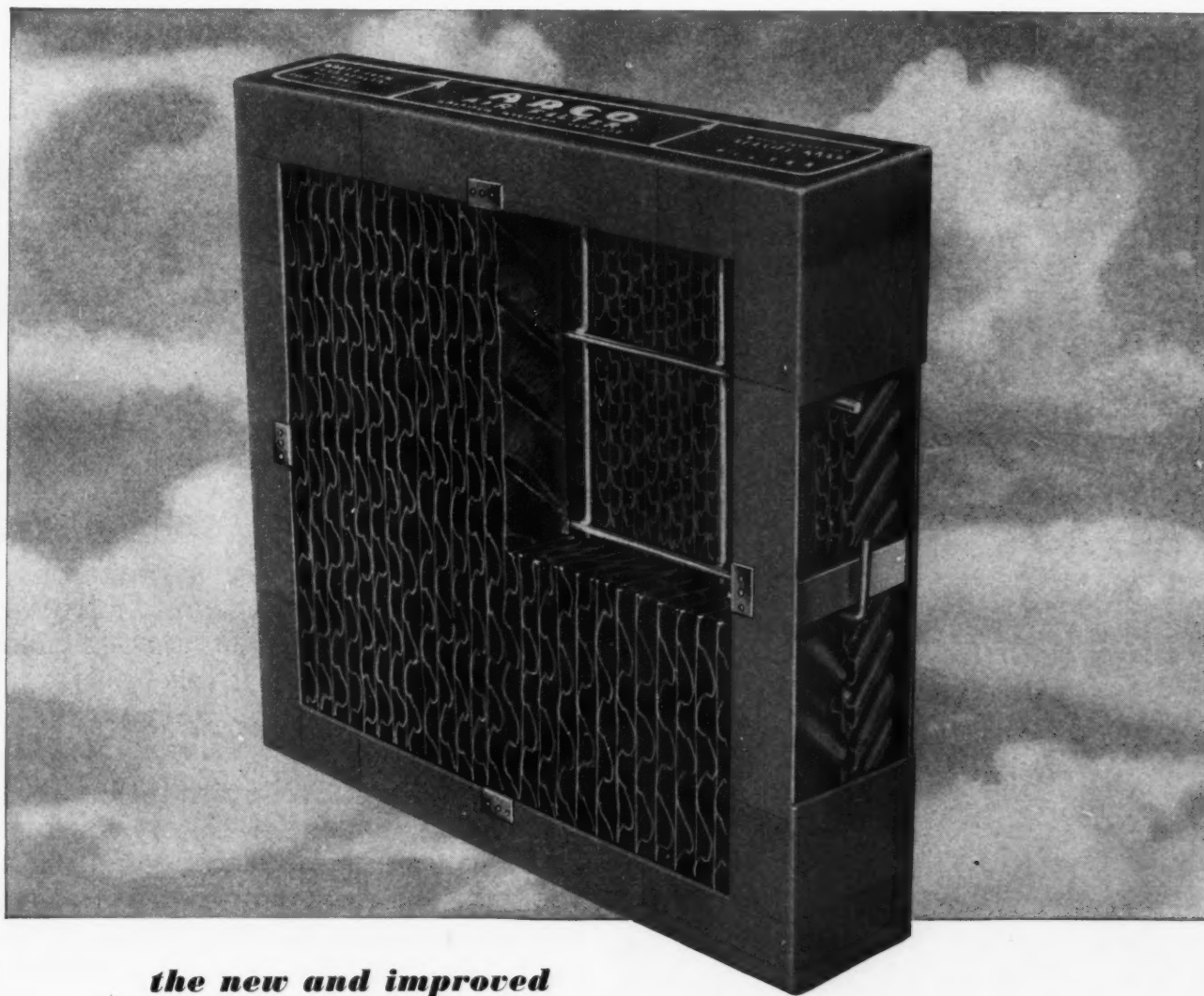
**SUPERIOR**  
OPEN HEARTH STEEL SHEET

Superior Galvannealed  
"Super-Metal"  
Special Coated

Hot Rolled Annealed,  
Pickled, Deoxidized  
Cold Rolled

Galvanized Sheet  
Galvanized Re-  
Long-Term

# Here it is!



*the new and improved*

## ARCO *Air* FILTER

OVER the past few years the Arco Air Filter has gained an enviable reputation for efficiency and long life. But now this famous V angle air filter is even better than ever before. The new model features several important improvements.

A unique metal latticework has been inserted between the two wafers. This reinforces the filter and prevents any chance of bulging or buckling. The latticework is anchored to clips that hold the frame. No

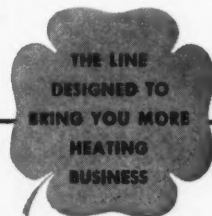
staples are used. As a result the filter is free to move within the frame.

The improved Arco Air Filter uses a new, odorless adhesive that won't run or drip and remains "tacky," even at low temperatures. As in previous Arco Air Filters, the 90° V angles change air direction and scrub it clean.

For better results, longer life and complete satisfaction in Air Conditioning and Ventilating Equipment use the new and

improved Arco Air Filter. It's available in all standard sizes. Special sizes, thicknesses and shapes can be furnished Also any desired resistance to meet specific requirements. Let us help you with your filter problems. Simply write —

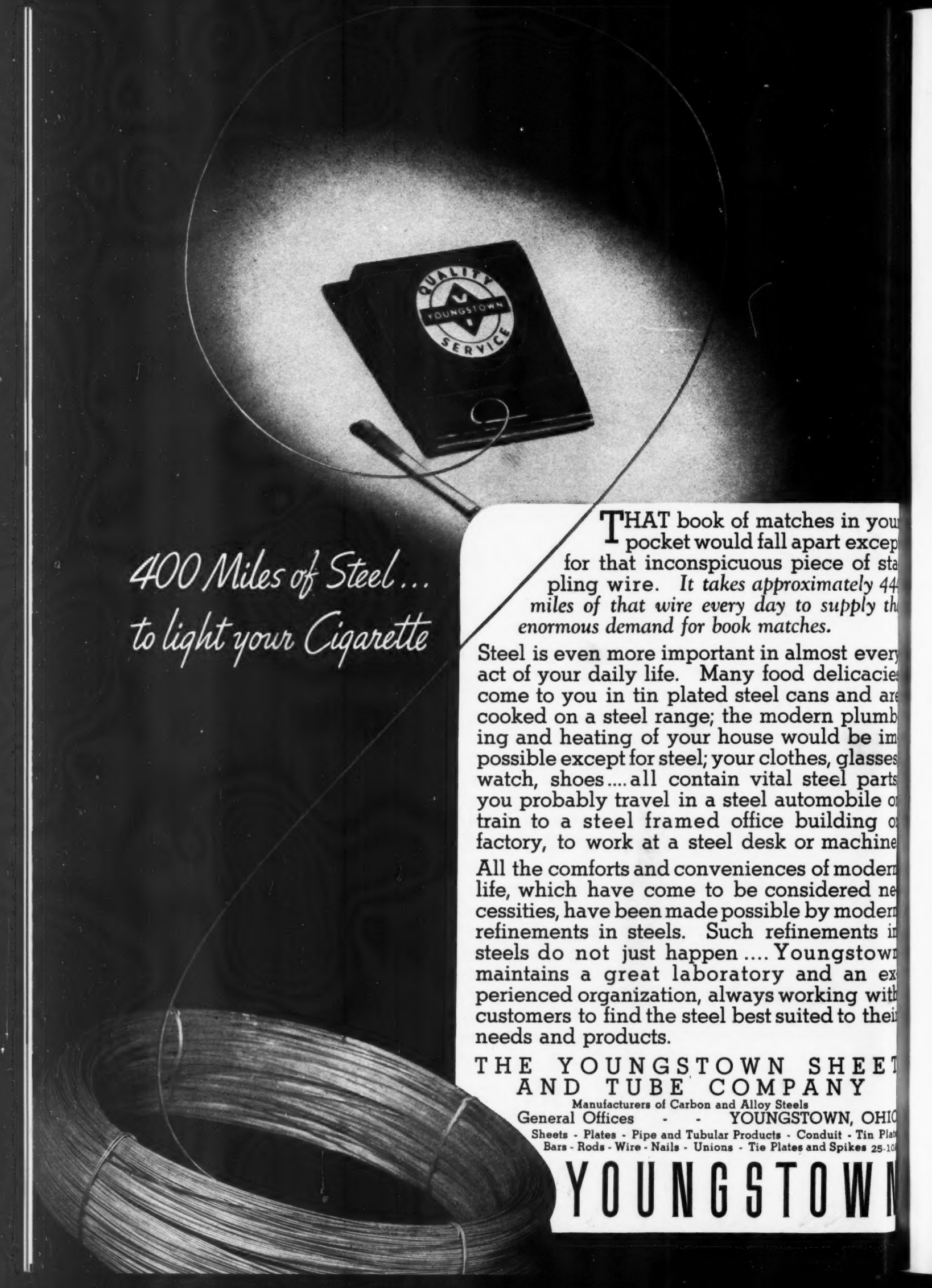
INDUSTRIAL DIVISION  
**AMERICAN RADIATOR COMPANY**  
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION  
40 West 40th Street, New York, N. Y.



## AMERICAN RADIATOR

HEATING AND AIR CONDITIONING





*400 Miles of Steel...  
to light your Cigarette*

**T**HAT book of matches in your pocket would fall apart except for that inconspicuous piece of steel wire. It takes approximately 44 miles of that wire every day to supply the enormous demand for book matches.

Steel is even more important in almost every act of your daily life. Many food delicacies come to you in tin plated steel cans and are cooked on a steel range; the modern plumbing and heating of your house would be impossible except for steel; your clothes, glasses, watch, shoes....all contain vital steel parts. You probably travel in a steel automobile or train to a steel framed office building or factory, to work at a steel desk or machine.

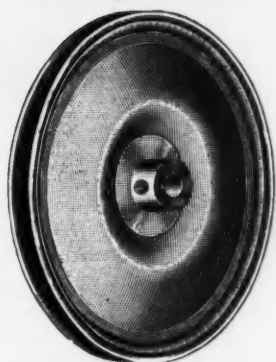
All the comforts and conveniences of modern life, which have come to be considered necessities, have been made possible by modern refinements in steels. Such refinements in steels do not just happen.... Youngstown maintains a great laboratory and an experienced organization, always working with customers to find the steel best suited to their needs and products.

**THE YOUNGSTOWN SHEET  
AND TUBE COMPANY**

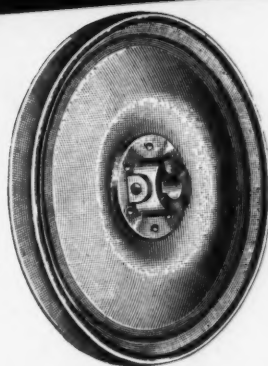
Manufacturers of Carbon and Alloy Steels  
General Offices - - YOUNGSTOWN, OHIO  
Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate  
Bars - Rods - Wire - Nails - Unions - Tie Plates and Spikes 25-100

**YOUNGSTOWN**

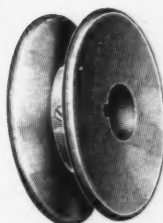




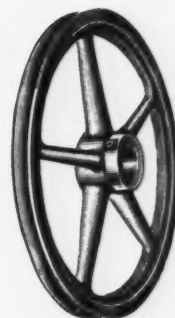
Steel



Steel with  
Malleable Hub



Solid  
Steel



Cast Iron

# MAUREY Pulleys *and* Fans

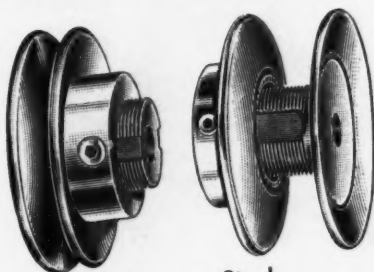
Your assurance for long trouble-free service with F. H. P. motor installations in Air Conditioning Units, Stokers, Blowers, Fans.

Be Sure to Visit Our Booth No. 133 At  
the Refrigeration and Air Conditioning  
Exhibition

January 16 to 19, 1939

STEVENS HOTEL

Chicago, Illinois



Maurey Steel  
Variable Pitch Pulley

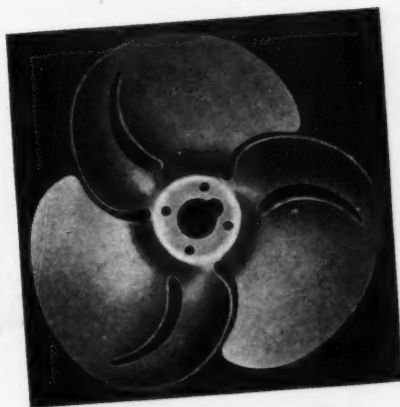
Where quiet, dependable, long lasting PERFORMANCE is necessary, users of V-Pulleys and Fans naturally turn to MAUREY. The record of MAUREY Products for giving unfailing, trouble-free service under severest operating conditions is recognized throughout the industry.

MAUREY Pulleys and Fans are designed and engineered to do a perfect transmission job with F. H. P. motors. They are accurately made, balanced and true running. Attractively finished in aluminum lacquer.

MAUREY Pulleys are carried in stock in a wide variety of sizes, both single and double groove, for "A" and "B" belts. Fans in sizes from 6 1/2" to 16" in diameter are available.

Write for Circulars and Prices

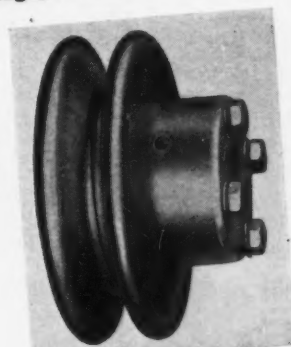
**MAUREY MANUFACTURING CORPORATION**  
Wabash at 29th, Chicago, Illinois




Maurey Patent Quiet Fan



Double Groove Fan Pulley



Single Groove Fan Pulley



*400 Miles of Steel ...  
to light your Cigarette*

THAT book of matches in your pocket would fall apart except for that inconspicuous piece of steel spring wire. It takes approximately 44 miles of that wire every day to supply the enormous demand for book matches.

Steel is even more important in almost every act of your daily life. Many food delicacies come to you in tin plated steel cans and are cooked on a steel range; the modern plumbing and heating of your house would be impossible except for steel; your clothes, glasses, watch, shoes....all contain vital steel parts. You probably travel in a steel automobile or train to a steel framed office building or factory, to work at a steel desk or machine.

All the comforts and conveniences of modern life, which have come to be considered necessities, have been made possible by modern refinements in steels. Such refinements in steels do not just happen.... Youngstown maintains a great laboratory and an experienced organization, always working with customers to find the steel best suited to their needs and products.

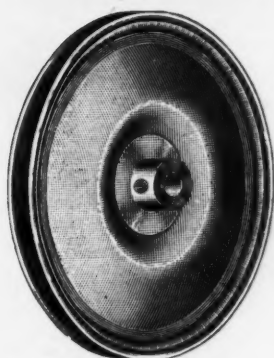
## THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

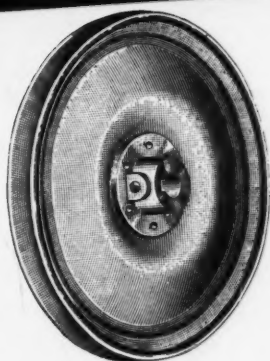
General Offices - - - YOUNGSTOWN, OHIO

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate  
Bars - Rods - Wire - Nails - Unions - Tie Plates and Spikes 25-104

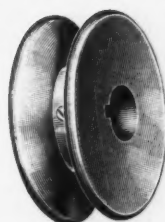
# YOUNGSTOWN



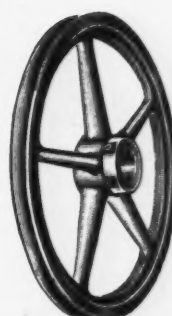
Steel



Steel with  
Malleable Hub



Solid  
Steel



Cast Iron

# MAUREY Pulleys *and* Fans

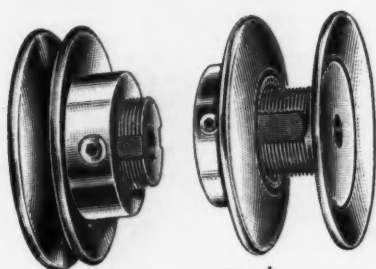
Your assurance for long trouble-free service  
with F. H. P. motor installations in Air Con-  
ditioning Units, Stokers, Blowers, Fans.

Be Sure to Visit Our Booth No. 133 At  
the Refrigeration and Air Conditioning  
Exhibition

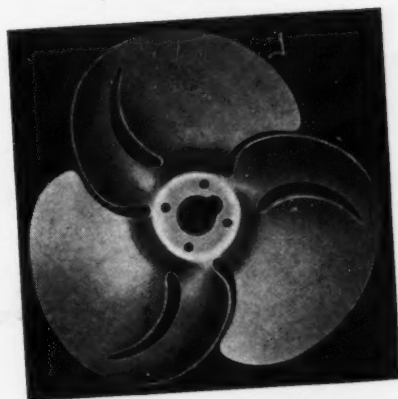
January 16 to 19, 1939

STEVENS HOTEL

Chicago, Illinois



Maurey Steel  
Variable Pitch Pulley



Maurey Patent Quiet Fan

Where quiet, dependable, long lasting PERFORMANCE is necessary, users of V-Pulleys and Fans naturally turn to MAUREY. The record of MAUREY Products for giving unfailing, trouble-free service under severest operating conditions is recognized throughout the industry.

MAUREY Pulleys and Fans are designed and engineered to do a perfect transmission job with F. H. P. motors. They are accurately made, balanced and true running. Attractively finished in aluminum lacquer.

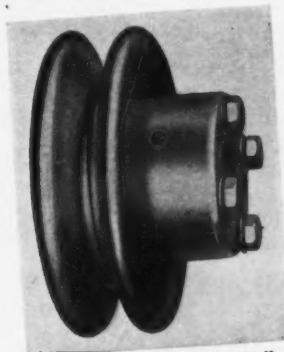
MAUREY Pulleys are carried in stock in a wide variety of sizes, both single and double groove, for "A" and "B" belts. Fans in sizes from 6 1/2" to 16" in diameter are available.

Write for Circulars and Prices

**MAUREY MANUFACTURING CORPORATION**  
Wabash at 29th, Chicago, Illinois



Double Groove Fan Pulley



Single Groove Fan Pulley



FOR GAS HEAT AND HOT WATER..



you can't  
do *better*  
than AGP



It means completely automatic comfort in lowest-priced floor furnace, or de luxe air conditioning.

IF YOU want the finest equipment—whether for the small home that needs a furnace or the mansion that requires complete air conditioning—you can't do better than **AGP**.

For this fine equipment brings not merely comfort—but *automatic* comfort; it's GAS-FIRED—and that means that even the fuel supply is automatic.

Your customers will be especially interested in the **AGP GAS-FIRED** storage water heater. It's the really automatic hot water supply to go with air conditioning installations. It's on the job 24 hours a day.

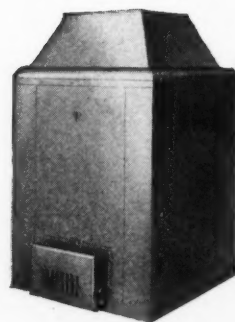
Let this famous seal and the best known name in Heating help you make more sales this year. Write today for full information.

MADE BY THE MAKERS OF IDEAL GAS BOILERS

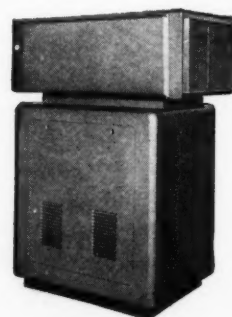
**AMERICAN GAS PRODUCTS**

DIVISION OF AMERICAN RADIATOR COMPANY  
40 WEST 40<sup>th</sup> STREET • NEW YORK, N.Y.

...and offices in all principal cities



**AGP GAS-FIRED** Gravity Furnaces...2 types, round and square...Cast Iron Heating Unit features economy and dependability at the right price.



**AGP Air Conditioner** uses the highly efficient counter-flow principle. Simple and economical in operation. Easily installed.



**AGP Air Conditioner Type 1-FP**—Four methods of installation make this flexible unit practical for any small home, with or without basement.

**AGP GAS-FIRED** Storage Water Heaters...3 types in full range of sizes and prices for every home. Tanks of Galvanized or new rustproof Arcoloy.



Approved by  
American Gas Association  
Laboratory

AMERICAN ARTISAN, JANUARY, 1939

# How Sheet Metal Shops are Increasing Profits

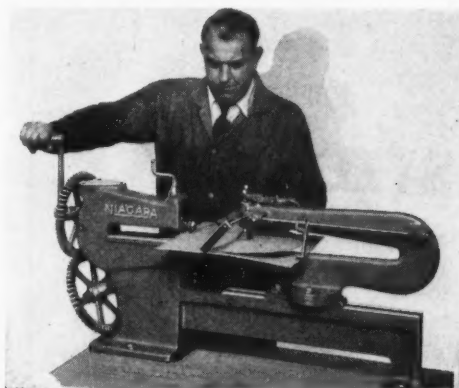
with

## NIAGARA MACHINES AND TOOLS

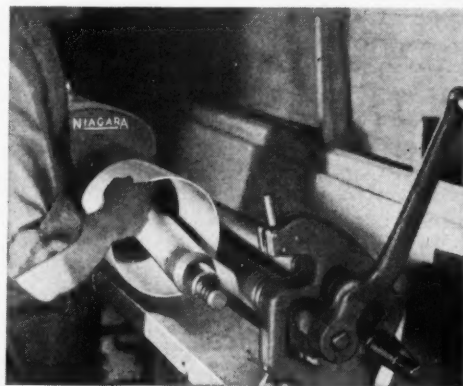
Air conditioning ducts, stainless steel store fronts and interiors . . . those are just a few of many jobs that require new and modern machines and tools. Sheet metal workers are saving time, material and costs with Niagara up-to-date equipment. The complete line is available in hand, foot and power operated models to fit your business. Write for Catalogue 94 giving complete information.



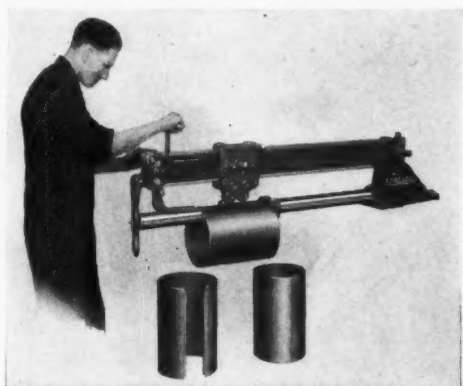
Easy, accurate work with Niagara Foot Shears.



Circle and Ring Shears for dozens of jobs.



Niagara Slip Roll Formers with Safety Trigger Release.



Niagara Groovers built in a complete line of sizes.



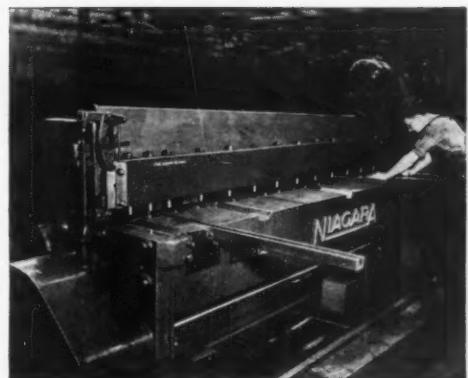
Electric Combination Machine  
Plugs into light socket.

Seven Machines in one.

**NIAGARA**  
MACHINE & TOOL WORKS

BUFFALO, N. Y.

Cleveland Detroit New York



Niagara Power Squaring Shears put your shop on a production basis.



Save time with Niagara Crimpers,—quick easy operation.



No. 164 Universal Rotary Machine for Burring, Turning, Wiring, Crimping and Beading.

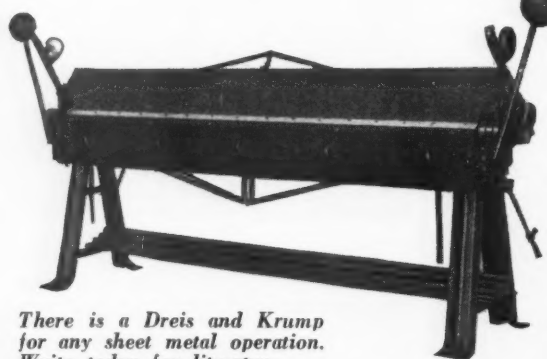
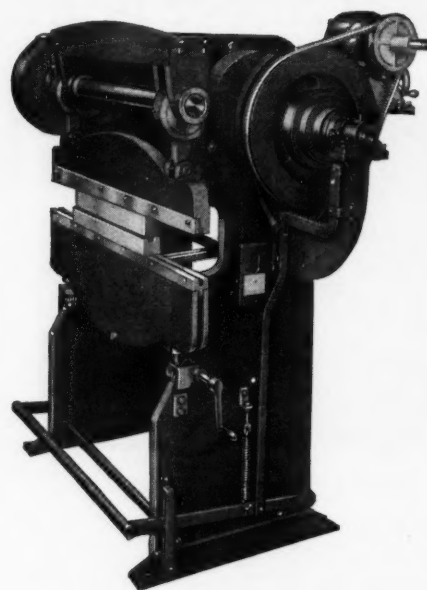


Niagara Folders and Brakes.

# CHICAGO STEEL PRESS NUMBER TWO FIFTY THREE

This compact, ruggedly built, 48", No. 14 gauge capacity, Chicago Steel Press brake is an economical and profitable production unit. It is ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes and a great variety of sheet metal specialties. It can easily do 40% to 60% of the forming work turned out by the average shop. Variable speed drive operates from 17 to 50 strokes per minute. Precision built of highest quality materials by master craftsmen. A quality item that no truly modern shop can afford to be without.

*Also made in larger sizes.*



*There is a Dreis and Krump for any sheet metal operation. Write today for literature.*

## CHICAGO STEEL BRAKE

Here is a brake manufactured for any and all types of straight bending and box and pan work. Made in 35 standard sizes for up-to-date sheet metal shops. We also build special brakes for difficult jobs. Consult us before you equip your shop with production machinery. We'll show you how Dreis and Krump items will save you time, money and worry. Best by test for over 40 years.

## NEW PORTABLE CHICAGO STEEL BENDING BRAKE

This portable brake was built to fill a definite need in air conditioning work—will bend and flatten  $\frac{1}{4}$  in. or wider seam on 22 gauge; will bend  $\frac{1}{2}$  in. flange or wider on 20 gauge—half the weight of regular brake with maximum strength—perfect for use on small job as well as large one, ideal for general shop use. Easy to truck right to the job. Legs are hinged to swing up and make very compact piece to carry. Clamping handles are made to be used for carrying. Top

and bottom sections are one-piece embossed steel plates to give greatest strength with minimum weight. Bending lead consists of solid plate reinforced with specially formed plate. One man can set it up by just bringing hinged legs to upright position and locking with convenient thumb screws. No loose parts to mislay. Brake always remains firmly in place without bolting to floor. Write today for more information on the entire line.

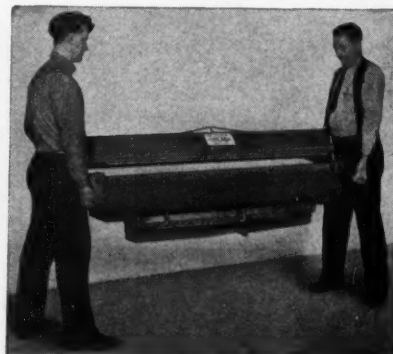
### One Man Can Set It Up



*Write for full details. A money-maker for every job.*

**DREIS & KRUMP MFG. CO.**  
7404 Loomis Blvd., Chicago

### Two Men Can Carry It





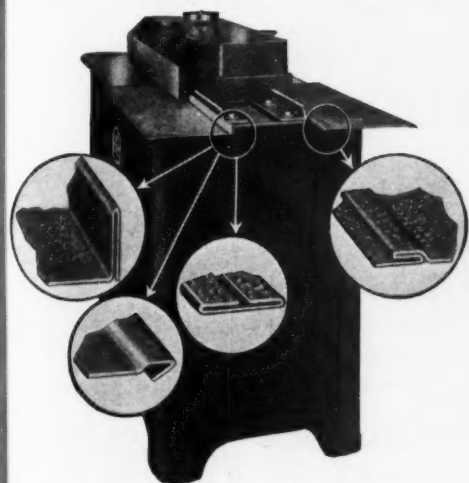
# MODERNIZE YOUR SHOP IN '39

## SAVE MONEY SAVE TIME

### WITH

# ALMAR EQUIPMENT

## The UNIVERSAL



DOUBLE PURPOSE LOCK FORMING— 18 ga.  
CAPACITY .....  
2 hp Motor

## ALMAR-BITTNER POWER FLANGER



For forming right angle flanges. Speed 15 to 25 feet per minute on 16 to 24 gauge.  
NOTE: Hinged head releases instantly for flanging inside circle.

Almar Lock Forming Machines are made in a complete range of capacities adaptable for all shops, namely, 22-20-18-16 gauge.

Leading shops in practically every state have shown a saving ranging from 25% to 50% in shop labor cost during the past TWO YEARS with ALMAR equipment.

THE ALMAR-BITTNER POWER FLANGER speeds up the flanging of fittings and gives you an adjustable flange from  $\frac{1}{8}$ " to  $\frac{3}{8}$ " in height.

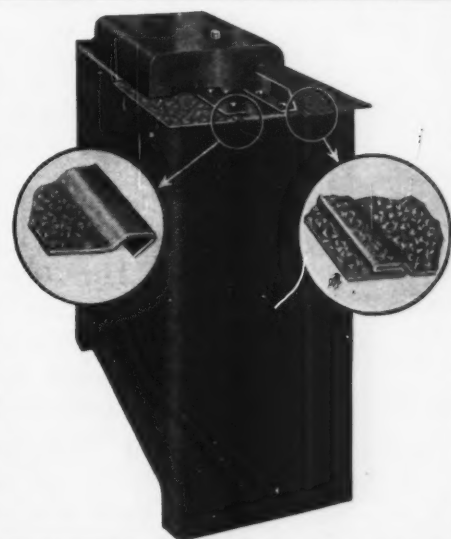
Resolve to modernize your shop methods in 1939.

## EASY EDGER



For Every Sheet Metal, Heating, Ventilating, & Air Conditioning Shop. Turns right angle flanges on curved, straight or irregular fittings. Capacity 20 gauge and lighter.

## The MASTER



DOUBLE PURPOSE LOCK FORMING— 20 ga.  
CAPACITY .....  
1 hp Motor

## SPECIAL HEAVY DUTY



For Industrial Fabricators, Ventilating, Air Conditioning, Manufacturers of Furnaces, Casing Stokers, Ovens, etc. 3 H. P. motor. 16 gauge and lighter—Recess in locks are  $\frac{3}{8}$ ". Speed 35 feet per minute. Weight, 1,400 pounds.

ALMAR EQUIPMENT WILL LOWER YOUR SHOP AND FIELD FABRICATING COST AND GIVE YOU SPEED — NEATNESS — STRENGTH AND EFFICIENCY. FULL DETAILS AND QUOTATIONS ON THE ABOVE EQUIPMENT WILL BE FORWARDED PROMPTLY UPON REQUEST.

# WARD MACHINERY COMPANY

MACHINES AND TOOLS FOR SHEET METALS

EXCLUSIVELY

RESSES - BRAKES - SHEARS - ROLLS - PUNCHES - UNISHEARS - BENCH & HAND TOOLS

564 W. WASHINGTON BOUL., CHICAGO, ILL.

# 1939...A BIG YEAR FOR WISE DEALERS

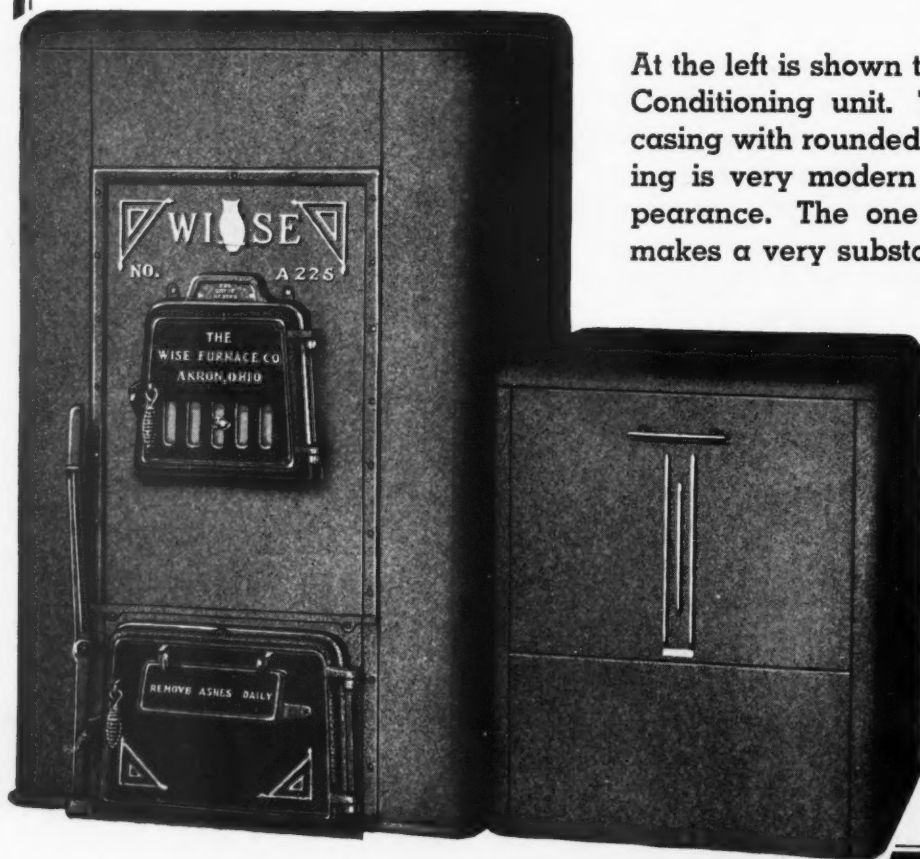
**F**ROM all appearances 1939 will be a banner year in the warm air heating and winter air conditioning industry. Sales records show a definite turn to the best in everything and that INCLUDES heating plants.

Protect your customer and yourself by specifying and installing Wise "Series A" gravity or air conditioning furnaces on those new or replacement installations. Shown at right is the Series "A" Gravity furnace featuring a HEAVY one-piece, absolutely self-cleaning radiator, air cell smoke consuming firepot, slipover fronts, ashpit and lower front in one solid piece and one piece cast base for both square and round casings. Truly a furnace that HAS EVERYTHING!



**WISE SERIES "A"  
GRAVITY FURNACE**

## THE SERIES "A" AIR CONDITIONING UNIT



At the left is shown the new Series "A" Air Conditioning unit. The square enameled casing with rounded corners and top molding is very modern and attractive in appearance. The one piece cast iron base makes a very substantial unit.

**WRITE**

*today for  
further  
information*

**WISE FURNACE CO.  
AKRON OHIO**

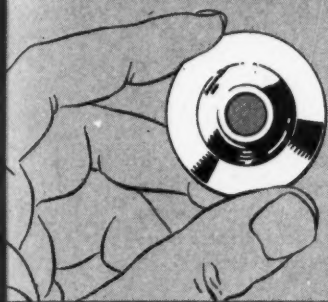


# now

*A lower priced damper regulator set  
... even quicker and easier to install*

## PARKER-KALON *Jiffy* REGULATOR SET

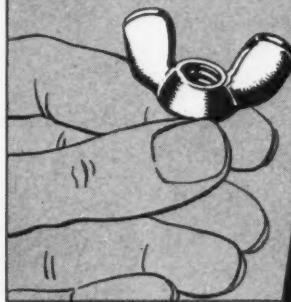
This is the **FRAME**



This is the **LEVER**

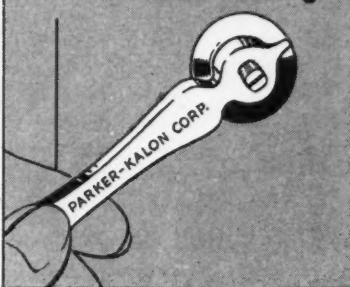


This is the **WING NUT**

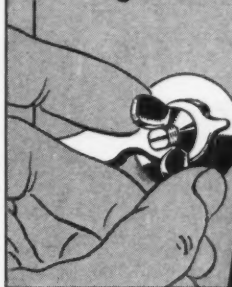


**INSTALLED  
IN A JIFFY!**

**Slip FRAME and LEVER  
on threaded Bearing**



**Turn on WING NUT  
—tighten**



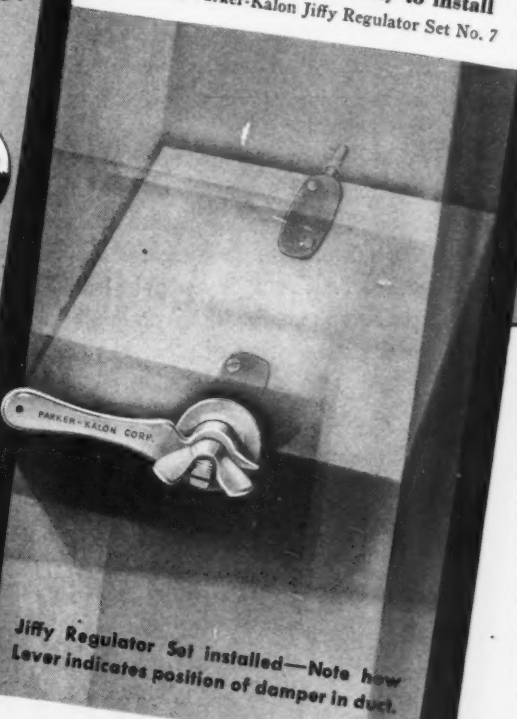
**"JIFFY"** is the name—because "jiffy" is the word that best describes the speed with which this *new* low-priced Parker-Kalon Damper Regulator can be installed.

You'll agree this is the neatest little unit you ever saw, designed and developed to meet the demand for a low-cost, efficient regulating device for domestic air conditioning and furnace installations. Order Parker-Kalon Jiffy Regulators today. Learn how these inexpensive sets can help you keep jobs on schedule, make work easier, save time. Parker-Kalon Corporation, 200 Varick Street, New York.

### *Jiffy* FEATURES



**SPEEDY**—Installed in a jiffy  
**ECONOMICAL**—Cost only a few cents  
**EFFICIENT**—Positive damper control  
... no rattles  
**ADAPTABLE**—Fits round or rectangular dampers up to 10"  
**DURABLE**—Heavy gauge steel, zinc plated  
**SAFE TO HANDLE**—No rough edges  
**HANDY COMPLETE SET**—Ready to install  
*Illustrated; Parker-Kalon Jiffy Regulator Set No. 7*



*Jiffy Regulator Set installed—Note how  
Lever indicates position of damper in duct.*

## *Also*—IMPROVED *Dial* DAMPER REGULATOR SETS with NEW SPRING-IN BEARING



Now the famous Parker-Kalon Dial Regulator Sets (1/4" for dampers up to 10"; 3/8" for dampers up to 20") will be more popular than ever—because:

(1) New self-locking Spring-in Round-end Bearing simplifies and speeds up installation of damper

- (2) Frame redesigned to eliminate damper rattles
- (3) Locking nut with key, supplied in place of Wing Nut, for tamper-proof installations, when desired
- (4) Now available made of brass as well as of steel

Products of **PARKER-KALON CORPORATION, NEW YORK**  
Sold only through Recognized Distributors



# Complete Range of Sizes

FOR ALL TYPES OF AIR CONDITIONING AND REFRIGERATION

**W**HEN you specify BAKER System Air Conditioning or Refrigeration, you assure your client of lasting dependability and economy of operation. That's because BAKER offers you the widest choice of sizes on the market. You can fit the specific requirements of every job—thereby eliminating the waste resulting from a machine that is larger than necessary, as well as guaranteeing longer life for a machine that is not too small for the load to be handled.

BAKER'S 77 models for Freon or Methyl Chloride range from the sturdy  $\frac{1}{4}$  H. P. unit to the powerful 60 H. P. size in single machine units, and unlimited capacities in multiple units. All sizes are equipped with genuine Timken tapered roller bearings, Nickelite connecting-rod bearings, and all the latest, tested improvements.

With this many models, it is simple for contractors and engineers to meet the individual requirements of every prospect, large or small. Post-installation headaches are eliminated because BAKER units are painstakingly planned, precision manufactured, and carefully installed under supervision of plant engineers.

*For complete information on the entire BAKER line, write*

# BAKER

## ICE MACHINE COMPANY, INC.



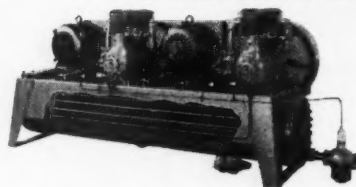
1553 EVANS ST.  
**OMAHA,  
NEBRASKA**



Branch Factories: Fort Worth, Los Angeles, Seattle. • Eastern Sales: New York. • Central Sales: Chicago.  
Sales and Service in All Principal Cities.

**AUTHORITY ON MECHANICAL COOLING FOR OVER 30 YEARS**

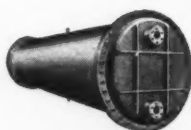
### BAKER DUAL CONDENSING UNITS



Designed especially for variable heat load requirements. Dual 4-cylinder type water-cooled Freon or Methyl Chloride unit, with automatic capacity control. Shell and tube type extra capacity condensers standard equipment (when used with evaporative type condenser).

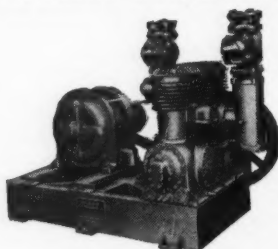
Cutaway view shows position and length of tubes.

### BAKER SHELL AND TUBE CONDENSERS AND LIQUID COOLERS



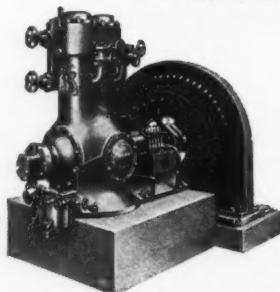
Baker Shell and Tube Condensers and Liquid Coolers are made in all sizes up to 2500 sq. ft. of effective cooling surface. Vertical, horizontal, multipass or singlepass types available, with diameters and tube lengths to fit any specification. Easily cleaned.

### BAKER FOUR-CYLINDER FREON COMPRESSION UNITS



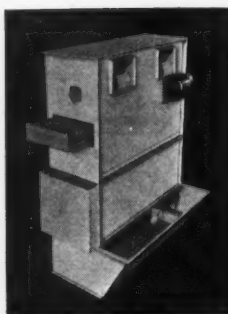
Baker 4-cylinder vertical enclosed type Freon compression unit, assembled on a rigid metal base with motor and automatic control. Available in 30 to 60 h.p. Timken anti-friction roller bearings, balanced bellows crankshaft seal, and built-in removable cartridge-type oil filter. Automatic pressure-type temperature control and high-pressure cut-out (thermostat type also available). V-belt drive. Compactly built, all parts easily accessible.

### BAKER AMMONIA COMPRESSORS



Available to 100 tons capacity with synchronous, direct-connected or V-belt drive. Baker compressors may be arranged in duplex or multiple installations for any desired capacity. Also equipped with double-suction capacity reduction where conditions require utmost economy of operation. Available in automatically controlled self-contained units ranging from 1 to 25 tons capacity, two and four cylinder types.

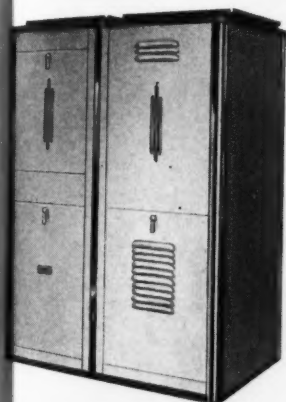
### BAKER EVAPORATIVE CONDENSERS



Compactly designed. Eliminates expense of cooling towers with separate condensers and the space necessary to house such equipment. Drastically reduces water costs. Casing is constructed of heavy metal, rigidly braced and thoroughly reinforced throughout. Non-corrosive type eliminators. Outdoor units weatherproofed.

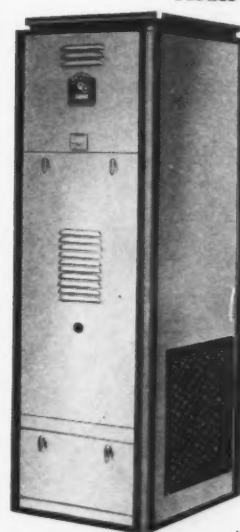


# Swing to TO INCREASE *Your* PROFITS

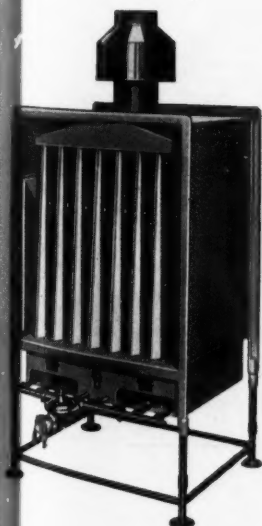


Pacific A-69  
Forced-Air Furnace

You can't stop satisfied users from talking, so the good news has spread that Pacific appliances are the ultimate in modern heating, ventilating and air-conditioning... modern, efficient, completely automatic in operation... properly priced, too. Architects are specifying, builders are demanding Pacific. **YOU PROFIT** by the manufacturing experience of a quarter century. **YOU WIN** friends and influence business when you install Pacific equipment. There is a Pacific Gas Heating Appliance for every purpose... to fit every budget.



Forced-Air Unit  
Model A-11



Duct Furnace

## IT WILL PAY YOU TO KNOW ALL ABOUT THE COMPLETE PACIFIC LINE, INCLUDING:

- |                           |                             |
|---------------------------|-----------------------------|
| Gas Circulating Heaters • | Gravity and Blower Furnaces |
| Radiant Circulators • Gas | • Forced-Air Units • Duct   |
| Steam Radiators • Floor,  | Furnaces • Overhead Units   |
| Dual and Single Wall      | • Water Heaters • Blowers   |
| Register Furnaces         | • Wall Heaters              |

Pacific equipment carries the A. G. A. Blue Star of Approval and meets all National Safety Requirements

## HERE ARE A FEW FAMOUS PACIFIC FEATURES:

Pacific Multi-Tubular Burner... Develops highest flame temperature possible... more heat with less gas.

All-Welded, All-Steel Furnace Heating Elements... Guaranteed for ten years... built for hard service and long life.

Scientific Engineering... Twenty-five years of continuous manufacturing experience building fine quality gas heating appliances.

Send for FREE literature and Information on our Liberal Dealer Plan

Pacific  
Blower

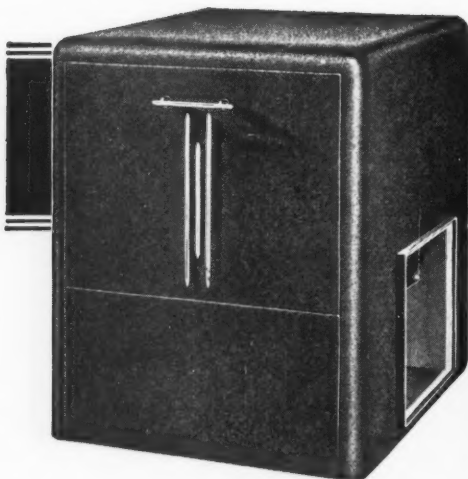


Pacific  
Gravity  
Furnace



**Pacific GAS RADIATOR CO.**  
1740 W. Washington Blvd • Los Angeles, California  
For Profit and Prestige, Be Specific... Specify Pacific





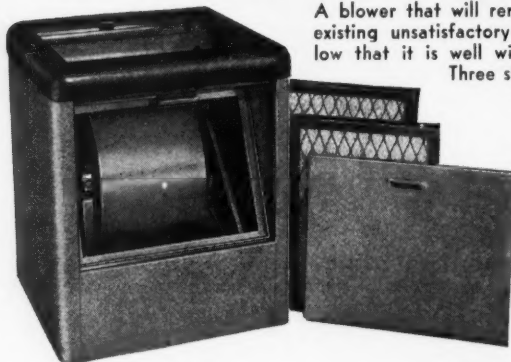
700 SERIES  
PACKAGE UNIT FURNACE BLOWER

Steps up efficiency of coal, gas and oil-fired furnaces. Complete with filters, blower cabinet, variable speed drive, blower and access doors on both sides. Motor and drive assembly are reversible . . . may be placed on the most convenient side—on the job. 8 sizes; knock-down construction!

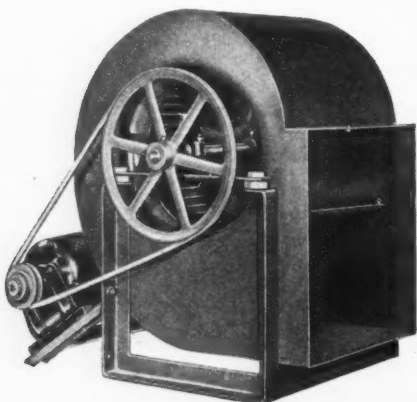
## It's LAU for AIR CONDITIONING EQUIPMENT

### BLO-ETTE PACKAGE UNIT FURNACE BLOWER

A blower that will remedy the many thousands of existing unsatisfactory gravity jobs at a price so low that it is well within the reach of everyone! Three sizes.

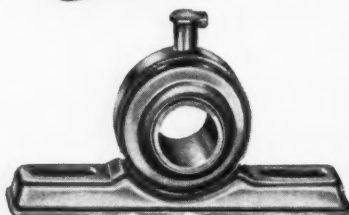


- Shipped assembled
- Top motor mounting
- Automatic cut - out on motor
- Large access door
- Leak-proof filter frames
- 16x25-inch filters
- Low speed — high pressure



100 SERIES ASSEMBLY

A complete blower assembly for manufacturers who fabricate their own casings. 8-sizes; variable speed drive; automatic belt-tightening device; automatic cut-out on motor. (Also available with top motor mounting.)



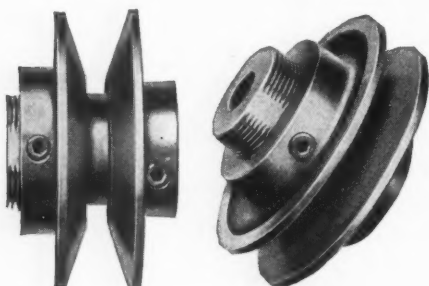
SELF-ALIGNING  
PILLOW BLOCK

Positive self-alignment at all times! Hold-down bolts cannot effect freedom of the bearing. Oil tight steel housing; reservoir holds twice as much oil as cast iron housings; Durex bushing feeds oil to the shaft by capillary action and maintains a constant oil film even when the shaft is not rotating. Spherical surface of bearing conforms to contour of housing, providing a universal joint action.



BLOWER HOUSINGS

Constructed of extra heavy gauge steel. Welded construction. Scientifically designed to guarantee uniform distribution of air. Available in 10 standard sizes. Special sizes available on request.



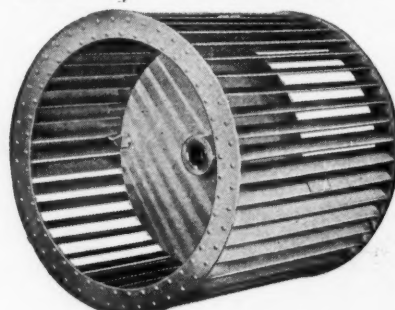
VARIABLE SPEED PULLEYS

Accurately machined from close-grained cast iron. Noiseless operation. Speed variations up to 30%. Stock bores — 1/2"; 3/4"; 1"; 1 1/4". Outside diameters 3.15" and 4.15".



CONSTANT SPEED PULLEYS

For "A" belts. Accurately machined from close-grained cast iron. Accurately balanced—true running — precision bored. Standard bores 15/16"; 1"; 1 1/8"; 1 1/4". Outside diam. 7"; 8"; 9"; 10"; 11"; 12"; 14".



BLOWER WHEELS

Squirrel cage, forward curve, multi-blade type wheels. Double inlet, double width (or single inlet, single width). All die-formed parts. Tested for dynamic balance. Guaranteed true and without vibrations at operating speeds. Sizes 4 1/2" to 25"—most any width.

New York  
Herbert A. Lovell  
445 Chanin Bldg.  
122 E. 42nd St.

—REPRESENTATIVES—

Western  
L. W. Swigert  
1912—21st Ave. North  
Seattle, Wash.

**THE LAU BLOWER COMPANY**  
DAYTON • OHIO



# INDEPENDENT "FABRIKATED"



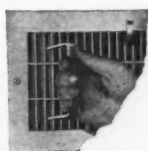
*Always leading... always progressing*

● For forty-one years, Independent has ever been at the forefront in building and improving registers and grilles for warm air heating and air conditioning installations. "Fabrikated" is an Independent creation and this construction excels in rigidity, appearance and large open area. The high point of "Fabrikated" construction is attained in Adjustable Directed Air Flow Air Conditioning Registers and Grilles

★ Reg. U. S. Pat. Off.

which deflect air flows in any desired direction. Whatever the requirements in "Fabrikated" or wrought steel registers and grilles, you can most satisfactorily meet them with Independent.

*Send for Catalogs*



## ADJUSTABLE DIRECTED AIR FLOW REGISTERS AND GRILLES

Every bar can be adjusted INDIVIDUALLY either before or after installing.

A-139

# THE INDEPENDENT REGISTER CO.

3747 EAST 93rd STREET

CLEVELAND, OHIO

**45 CHAPTERS**

**1272 PAGES**

**6x9 IN.**

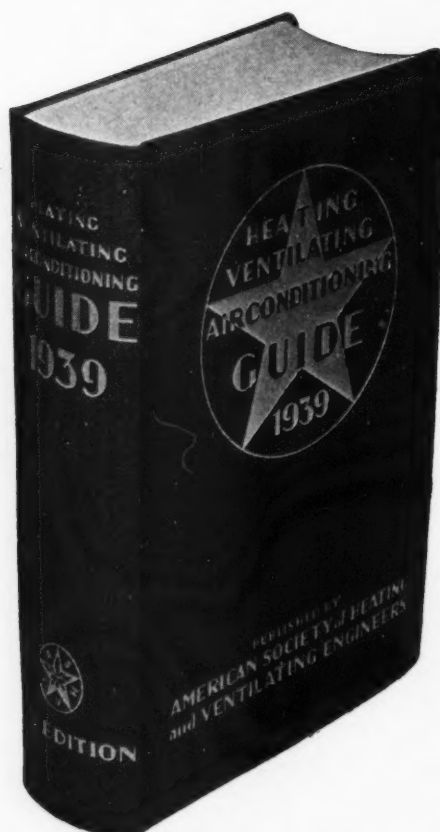
**BLUE FLEXIBLE**

**BINDING**

**STAMPED**

**IN**

**GOLD**



**CONTENTS**

1. Air, Water and Steam
2. Refrigerants and Air Drying Agents
3. Physical and Physiological Principles of Air Conditioning
4. Air Pollution
5. Heat Transmission Coefficients and Tables
6. Air Leakage
7. Heating Load
8. Cooling Load
9. Fuels and Combustion
10. Chimneys and Draft Calculations
11. Automatic Fuel Burning Equipment
12. Heat and Fuel Utilization
13. Heating Boilers
14. Radiators and Gravity Convectors
15. Steam Heating Systems
16. Piping of Steam Heating Systems
17. Hot Water Heating Systems and Piping
18. Pipe Fittings and Welding
19. Gravity Warm Air Furnace Systems
20. Mechanical Warm Air Furnace Systems
21. Central Systems for Heating and Cooling
22. Unit Heaters, Ventilators, Air Conditioning and Cooling Units
23. Cooling and Dehumidification Methods
24. Heat Transfer Coils
25. Spray Equipment for Humidification and Dehumidification
26. Air Cleaning Devices
27. Fans
28. Air Distribution
29. Air Duct Design
30. Sound Control
31. Air Conditioning in the Treatment of Disease
32. Railway Air Conditioning
33. Industrial Air Conditioning
34. Industrial Exhaust Systems
35. Drying Systems
36. Natural Ventilation
37. Automatic Control
38. Motors and Motor Control
39. Piping and Duct Insulation
40. Electric Heating
41. Radiant Heating
42. District Heating
43. Water Supply Piping and Water Heating
44. Test Methods and Instruments
45. Terminology

## YOU NEED THE NEW GUIDE

***If you are:***

**Engineer, you need The Guide to make plans, check estimates, write specifications.**

**Architect, you need The Guide to adapt modern equipment to structural design.**

**Contractor, you need The Guide in estimating costs or planning installation work.**

**Operating man, you need The Guide for the practical help it contains.**

**Educator, you need The Guide for technical guidance in classroom work.**

**Student, you need The Guide for theoretical and practical aid in your studies.**

**THE PRICE IS \$5.00**

*(With Special Thumb Index, \$5.50)*

## ORDER NOW — TO SHIP WHEN READY

**AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS  
51 Madison Avenue, New York, N. Y.**

Enclosed is { \$5.50 } for which send me soon as ready a copy of the Heating, Ventilating, Air Conditioning Guide 1939. It is understood I may return it within 10 days, if it is not satisfactory and you will refund my remittance.

Name .....

Position .....

Firm .....

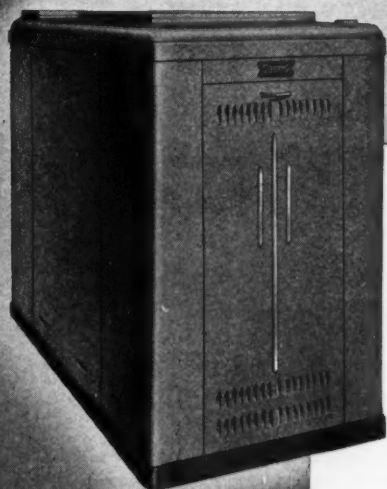
Address .....

City and State.....F

**REMITTANCE MUST ACCOMPANY YOUR ORDER**



# *Go ahead with* **MONCRIEF** **IN 1939**



Moncrief Gas Winter  
Air Conditioner



Aristocrat Coal-Fired  
Winter Air Conditioner



Aristocrat Oil-Fired  
Winter  
Air Conditioner

Business is going ahead in 1939. Go ahead with Moncrief and you will have every advantage with which to build a bigger and better winter air conditioning and warm air heating business.

Moncrief is constantly adding new and improved units to keep its line in the forefront of progress. Recent additions are the Moncrief LongLife Cast Furnace with the 20-Year Guarantee . . . the new Stoker-Fired Aristocrat Winter Air Conditioner . . . and new oil-fired and gas-fired winter air conditioners specially designed for small homes.

Moncrief makes a complete line of winter air conditioners for coal, gas and oil; and of cast and steel furnaces, blower-filter units, and automatic humidifiers.

A skilled engineering service, comprehensive sales literature, and a liberal financing plan are at the disposal of Moncrief dealers to help them develop business.

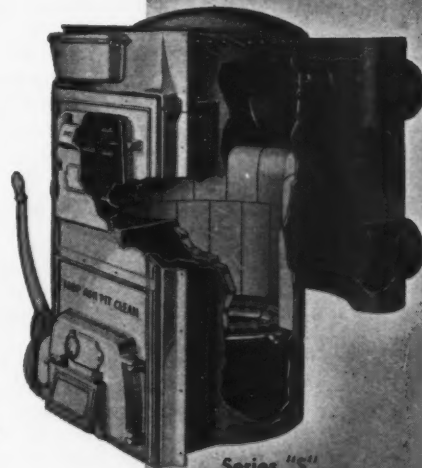
*If you want to go ahead in 1939, get the particulars of the Moncrief Proposition*

**THE HENRY FURNACE  
& FOUNDRY COMPANY**

**3473 EAST 49TH STREET • CLEVELAND, OHIO**



Series "C"  
Cast Furnace



Series "S"  
Steel Furnace  
(cutaway view)

**MONCRIEF SUPPLIES  
EVERYTHING USED ON  
A WINTER AIR  
CONDITIONING AND  
A WARM AIR  
HEATING JOB**



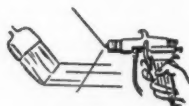
# USE THIS HANDY BUYING GUIDE TO BETTER SHEET METAL SERVICE THROUGH THE ARMCO DISTRIBUTOR

Here's your buying guide to dependable sheet metals. Variety enough at your finger tips for every conceivable sheet metal job. It is a handy reminder that the Armco distributor can supply all standard sizes and gages the way you want them, when you want them. And you can be sure of highest quality in every grade because it's made by Armco and backed by the largest, most complete research laboratories in the flat-rolled iron and steel industry. Make this your reference page for 1939.



## GALVANIZED ARMCO INGOT IRON

A long lasting, highly refined iron developed by Armco. Noted for its easy-working qualities. The galvanized coating is full weight, tightly adherent, bright and attractive. Strong resale value is assured by 25 years of consistent national advertising. Use this durable metal for duct work, ventilators, roof drainage systems or wherever moderate corrosive conditions are present.



## GALVANIZED PAINTGRIP SHEETS

Helps make sales. Customers appreciate the full protection of galvanizing PLUS the immediate beauty of paint made possible by this special sheet. No acid etching or weathering. PAINTGRIP also helps preserve the natural oils in paint, keeps it flexible and protective. Ideal for ducts, gutters, downspouts, signs and all other exposed sheet metal work.



## STAINLESS STEELS

A correct grade and finish for practically every purpose. Is readily sheared, punched, deep-drawn, welded, riveted or soldered. Some building uses for Armco Stainless Steels are roofing and roof drainage, decorative trim, sinks, drain boards, kick plates and many other applications where sanitation, attractiveness and durability are desirable.



## ARMCO INGOT IRON HOT ROLLED

Produced on Armco-invented continuous mills. True to size and gage, welds densely and evenly and can be easily formed into smokestacks, fan blades, fuel oil tanks, heating elements and other equipment.



## GALVANIZED ZINCGRIP SHEETS

An exclusive Armco product. Excellent for use where heavily galvanized sheets must be formed severely without injuring the protective zinc coating.



## HIGH TENSILE SHEETS

Armco H. T.-50 is a low-alloy, high tensile sheet steel possessing great strength such as may be required in formed structural members. Possesses four to six times the atmospheric corrosion resistance of ordinary steel. Cold-works and welds as easily as mild steel.



## FOR QUICK DELIVERIES . . .

Call the nearby Armco distributor. You'll like his friendly helpful service equal to any emergency. Jot down his telephone number in the space below. Then call him on that next sheet metal order. If you do not know the Armco distributor write us for his address.

## ARMCO DISTRIBUTOR PHONE NUMBER

THE AMERICAN ROLLING MILL COMPANY  
81 Curtis Street, Middletown, Ohio



# ARMCO SHEET METALS

# More Than 50 YEARS Of Progress

A grand line in 1889 . . . and a grander line in '39 . . . certainly more than fifty years of successful operation is ample proof that the Grand Prize Line of "HOME COMFORT" Furnaces possesses every qualification for durability, faultless operation, economy and last, but most important—stability. Through these years "HOME COMFORT" Furnaces have been constantly improved, and the present line is the acme of modern furnace design and construction. They are in demand . . . they sell . . . and sales mean profits for you. It is the line that will help you get more business . . . so write for complete information today.

## THE GRAND PRIZE LINE

### "HOME COMFORT" CRESCENT FURNACES

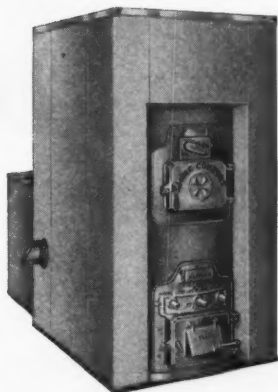
1000 Series and 500 Series

These steel furnaces in their modern casings have many features which cannot be found in other furnaces of their type and capacity. Fabricated of boiler plate steel, in stream-line design, all joints either riveted or arc-welded insuring solid and gas tight construction. Any type of fuel can be used, assuring your customer the highest in efficiency, and economy of operation. Their low prices make them the most popular in the "HOME COMFORT" line.



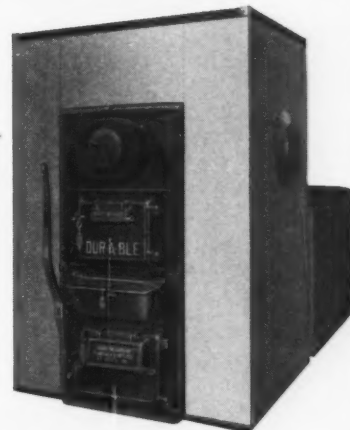
### "HOME COMFORT" TUBULAR FURNACE

The Tubular Radiator construction assures maximum effective radiating surface, and gives you a selling argument few other lines can match. The greatest dollar for dollar value in the entire "Home Comfort" line. "HOME COMFORT" has built its reputation on this furnace for the past fifty odd years, and you can do the same.



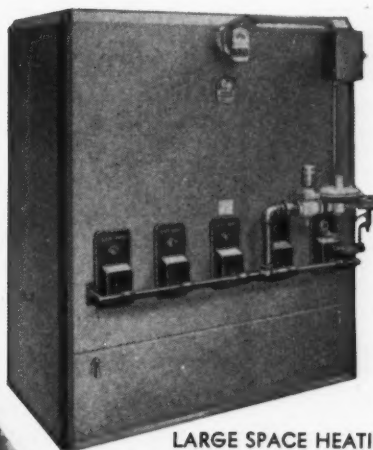
### "HOME COMFORT" DUR-A-BLE CAST IRON FURNACE

This extra heavy cast iron furnace with one piece radiator, is in keeping with "HOME COMFORT" quality. The easy to erect rectangular casing, requiring no screws or bolts for assembly is standard on this as well as all other "HOME COMFORT" products. Cuts installation time to a new low. This Unit incorporates many exclusive features that makes it a most attractive buy.



### "HOME COMFORT" SUPERIOR GAS FIRED AC UNIT

An all steel furnace of superior design and construction. The new "Fin-Type" All-Steel heating element, built-in Blower, Venturi-Type round burner, and complete safety devices are just some of the features of this great furnace.



### "HOME COMFORT" OIL-FIRED AC UNIT

An all steel strictly arc-welded Unit, especially designed for oil burning, embodying all the features of winter air conditioning with full automatic and trouble-free operation at low cost.



LARGE SPACE HEATING EQUIPMENT ALSO AVAILABLE UP TO 3,000,000 B.T.U. CAPACITY IN A SINGLE UNIT.

For details wire or write.



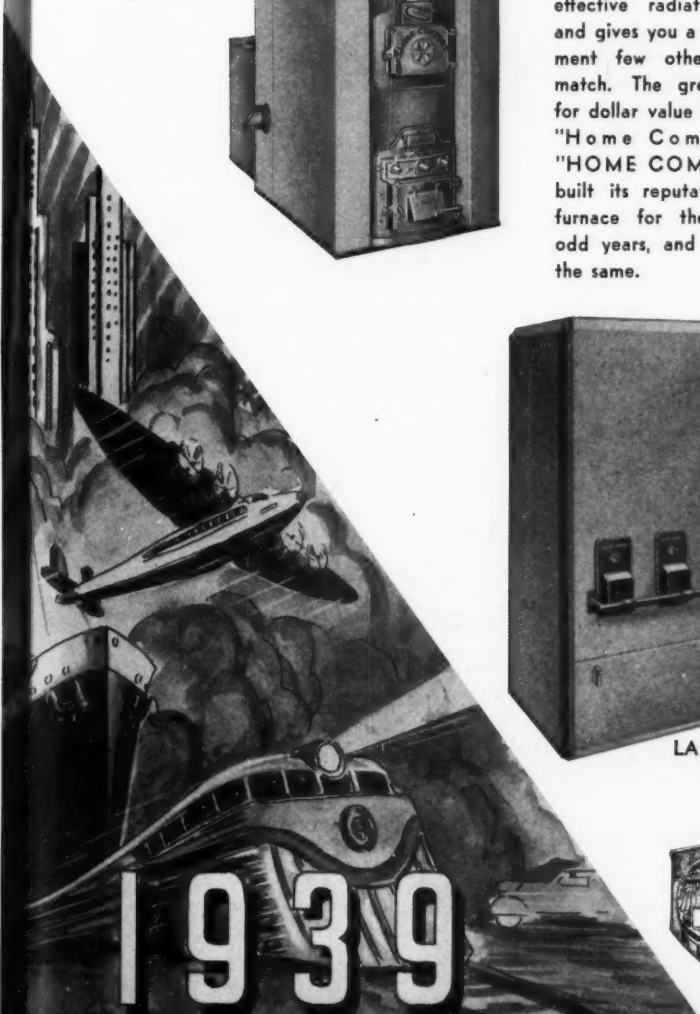
**ST. LOUIS FURNACE**  
**MANUFACTURING COMPANY**



2901-11 ELLIOT AVE.

ST. LOUIS, MO.

1939





"It is only natural for men who are constantly beleaguered by salesmen to adopt a mask of sales resistance. Some of us pretend to be Tough Guys. Others pose as Funny Guys. And today a slew of us, admittedly grasping at an excuse to defer decisions, have adopted the downcast attitude of the Sad Guy.

"But all of us have one thing in common . . . we hang up our masks of sales resistance when we pick up *American Artisan*. We pay subscription cash for it because it

brings us money-making ideas suggested by editors who know warm air heating, air conditioning and sheet metal contracting inside and out.

"We read the advertisements, too, because we know that any advertiser in *American Artisan* is addressing his message to us because he has something real to offer . . . not because he gets editorial 'puffs.' Those advertisers' salesmen stand the best chance of getting back of our protective masks when they call!"



# Get the **NEW** **Furblo** **ENGINEERING** **BULLETINS**

By G. A. VOORHEES

DIRECT-READING HEAT LOSS TABLES  
FOR "INSTANT ESTIMATING"

HOW TO ESTIMATE STATIC PRESSURE

HOW TO DETERMINE  
PROPER CHIMNEY SIZE AND HEIGHT

HOW MUCH FUEL DOES FORCED AIR SAVE?

PIPE SIZE CHARTS FOR QUICK ESTIMATING

HOW YOU CAN MORE ACCURATELY  
DETERMINE FURNACE CAPACITY  
FOR RADIANT HEATING

HOW TO CHANG  
TER TEM

HOW TO A  
BLOWE

FORCED AIR FORMULAS  
FOR EASY FIGURING

HOW TO BAFFLE FURNACES

SELECTING BLOWER FOR CONVECTION

2-SPEED BLOWER OPERATION  
ADVANTAGES

HEATING CAPACITIES OF WALLS AND  
ROOFS

STACKS

"TROUBLE SHOOTING"

C.F.M.  
DETE  
F.P.M.

TABLE  
VENTI

Furblo Co., Hermansville, Mich.

**YES**

I would like to receive the NEW 1939 Furblo Engineering Bulletins.

My Name .....

Firm Name .....

Address .....



**YOU'LL BE READY FOR  
ANY JOB WITH**



*Sheets*

Think of it! A complete line of sheets that cover every requirement of sheet metal work. And every grade of the same uniformity and high quality for which all Republic Steel products are well known.

For all ordinary work, there are Republic steel sheets—or copper-bearing steel sheets

if the job needs a better sheet that resists atmospheric corrosion. For highest resistance to rust, there is low-cost Toncan Iron—the sheet used in the air conditioning ducts shown above—or Enduro Stainless Steel, the beautiful metal that lasts indefinitely. All but Enduro are available black, galvanized or galvanized—flat, corrugated or in various roofing forms. And to complete the line, there are N. and G. Taylor 40-pound copper-bearing roofing ternes.

With the complete line, you'll be ready to take any job—and you'll be able to make greater profits. Write for further information. Republic Steel Corporation, General Offices, Cleveland, Ohio.

# Republic Steel

BERGER MANUFACTURING DIVISION • STEEL AND TUBES, INC.  
UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY  
NILES STEEL PRODUCTS DIVISION



## 1939—Looking Forward

THIS industry, generally, approaches 1939 with the feeling that the coming year will be better than 1938. It is booming in on the wave of increased business which began last fall and, unless war, or politics, or general business conditions upset all prognostications, 1939 should carry along at a profitable level throughout the coming year.

Some phases of this encouragement are based upon conditions which seem impossible of disturbing. For example, there is now and will be all through the coming year, a drive to stimulate new house construction. All governmental agencies are agreed that a tremendous shortage in single family houses exists and must be eliminated. And, since the greatest shortages exist for the class of wage owner who can afford to build or buy nothing costing over \$3,000, we will see during 1939 a big push for new \$3,000 and less, homes.

The question is, has this industry available satisfactory types of heating equipment for this priced house? FHA seems to feel we do not have the types needed. We know, however, that a great many manufacturers have ready or under development small units designed especially for the small house.

Contractors must develop designs so that a low-priced unit can be installed in a low priced house at a low price. Not necessarily a non-profit price, but a low price obtained by overall simplification of the installation. The low cost house heating systems shown in the June, 1938, issue of AMERICAN ARTISAN are typical.

One thing this industry must do during 1939 is to consolidate our relationship with FHA. This governmental agency, after all, seems likely to be the controlling factor in all new house building. After months of education by a committee from our industry, FHA is favorably inclined to warm air heating. This attitude should be fostered and not allowed to languish. We, as an industry, are going to need every new house we can get during the coming five years.

Without any question, costs of doing business are going up. Materials and equipment are increasing in price. Labor is getting organized to spread unionism across the country and even where the unions do not get a stronghold, wages asked by mechanics will eventually increase. Our apprenticeship program has fallen by the wayside, it would take only a mild business

increase to bring about another acute shortage of mechanics.

Air conditioning is still attracting the opportunist. Despite the millions of dollars lost by individuals and organizations who saw in air conditioning an opportunity to make a lot of money quickly, this industry still looks like the promised land to a great many persons and so long as this continues the established industry will have competition of all types to contend with. Nor is legitimate competition going to lessen. Quite the contrary, if building develops into definite grooves competition for business in those grooves will sharpen.

Everyone will agree, doubtless, that betterments in human comfort are still in the development stage. Cooling of homes is still "on the way." That cooling will come, we all agree. but when, and how, and through what methods no one can guess. Winter air conditioning is definitely "here." Reports from areas all over the country; from big cities and small towns; even the rural areas are buying winter air conditioning because of its obvious advantages.

And the public is, likewise, convenience minded. Although sales of oil burners and stokers and gas equipment were not as large in 1938 as in 1937 we should remember that as more and more units go in the time must come when yearly increases cannot be obtained excepting as this industry makes its products available to lower and lower income groups. This we are doing.

Business, for the business man, is not going to be easy sailing in 1939. There seems little likelihood of any substantial lessening of the pressure of politics, war, social changes, and the hundred and one smaller aggravations which beset all of us.

But any business man can do this.

First, forget these aggravations or else worry over them only during spare moments.

Second, determine to drive with increased vigor for increased volume.

Third, see to it that every job sold carries a profit.

Fourth, to insure this profit see that every item of expense or overhead is included in every estimate.

Fifth, devote all possible time to those movements which will benefit this industry and see that everyone with whom business is done also does his part.





Exterior and interior views of the Brenner establishment. The interior shows that part of the first floor where hand work is carried on. Behind is the heavy machine shop. Upstairs is the small parts and light machine shop. Practically all types of machines, both hand and power, are employed in the making of the specialty items described in this article.



## BRENNER Gives Men

# Year 'Round Work Fabricating Specialties

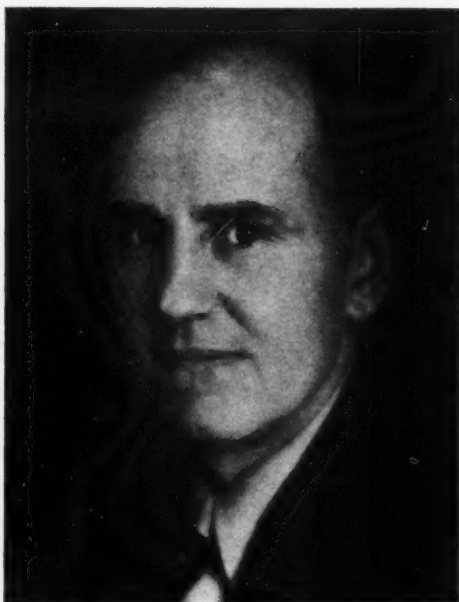
ABOUT the time NRA was causing sheet metal contractors to dig into operations to find ways and means of complying with the then unheard of regulations, the Jacob Brenner Company, Inc., Fond du Lac, Wisconsin, found itself in a peculiar position. The firm, founded in 1900 by Jacob Brenner, was all set up and equipped to carry on a volume production and erection of architectural sheet metal work and industrial metal fabrication, but with no work being let to contract and shop and men standing idle during too much of the year.

The situation, as T. P. Brenner, son of Jacob and manager of the firm, sized it up was unhealthy. Lack of volume greatly increased the overhead with the result that every bid had to carry such a high overhead charge that prices were either too high to get contracts or men and equipment were idle thus adding to the vicious circle of overhead burden. The only solution seemed to lie in a change in operations which would bring into the shop a

steady volume of work which would employ men and machines.

Although the solution looked simple on paper, the job of finding firms wanting metal fabricated and changing production from a combination of field and shop to a major shop procedure proved not at all easy. The capabilities of the equipment, fortunately, were such that both heavy and light gauge material could be handled, but some practices then used only occasionally in connection with industrial or architectural work had to be revised and bettered so that consistent costs on these operations were brought into line with going prices.

The only experience the firm had had up to that time in fabricating specialties on a production basis consisted of the manufacture of a steel warm air furnace which now has been in production since 1921 and the production of organ blowers now entering their seventeenth year of manufacture by Brenner. These constituted, however, two distinct classes of work. The furnaces, rolled from heavy



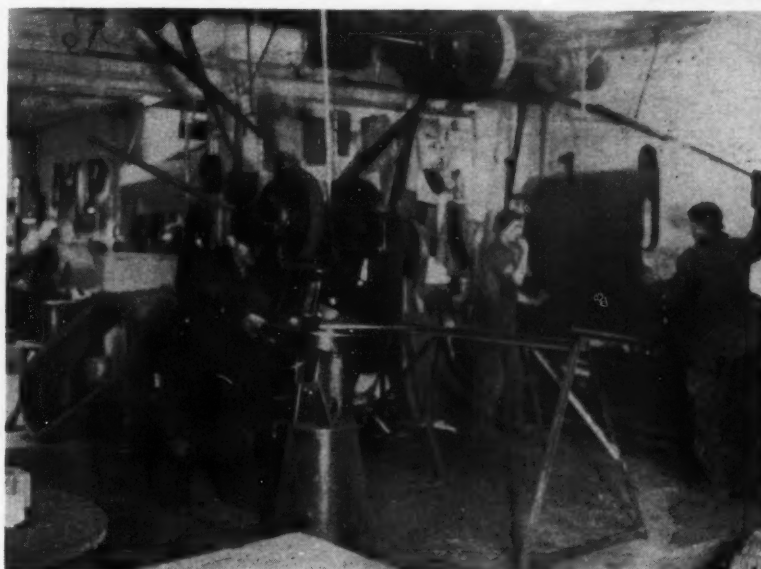
**T. P. Brenner, son of the founder and present manager of the organization, who launched the specialty idea.**

gauge plate, required power machinery to roll and form, welding to make gas tight, grinding to finish; the organ blowers used 16-gauge black iron for the cabinets and 20 and 22-gauge galvanized iron in the wheels and blades; between the two items a variety of operations and machines gave a fair cost analysis for work of this nature.

#### **Brenner Gives Men 12 Months Work**

One by one during the years since the decision was made to go into production on specialty items, new products have been brought into the shop. Some of these items have been in steady production ever since; some items cost so much to produce that the buyer went elsewhere; some items did not carry sufficient profit to warrant keeping them in the shop; some contracts contributed consistently to volume year after year; some products proved so intermittent that profits were always open to question. But by constantly bringing in and trying to adapt shop facilities to production, a line of products has been built up.

Brenner makes the furnace shown to the right; even round casings and rings, buying only square casings and cast iron parts. The heavy plate is formed and fabricated in the heavy machine shop shown below where mechanics are shearing and rolling the drum of a furnace.



T. P. Brenner now employs at least fifteen mechanics; in rush seasons twenty mechanics; but at least fifteen men are given steady work all year through. Today, the firm is not dependent on the vagaries of the building industry; it does not have to worry about modern architecture eliminating sheet metal ornamentation, even the weather is not a serious menace and, best of all, the firm can base its hopes for profit on a steady volume and dollar income.

The number of specialty items and the variety of products fabricated range from small items to large items, from intricate fabrication to rough fabrication, from items requiring much hand work to items fabricated mostly in the machines.

#### **Small Display Racks**

To illustrate, one of the photographs shows a mechanic assembling small display racks. This rack is quite small; it requires shearing and forming of several small pieces; these have to be assembled piece by piece, then soldered; the rack after assembly must be finished smooth and spray painted; each rack must stand squarely on a flat surface



and be nice enough appearing to stand out on a show case. These racks are ordered by the firm which uses them in lots of about 1,000 racks.

In contrast the furnace (which is sold under the Brenner name) requires power shears to cut the sheets, power rolls to roll the drum and radiator, electric arc welding to put together and a minimum of hand finishing. The furnaces are furnished in sizes from 21-inch to 30-inch and with either round or square casings. Round casings are made in the Brenner shop of galvanized iron; the casing rings are also made in the shop; the casing can be had either



At right — Small display racks — cut, soldered, finished complete by Brenner and left — a stoker hopper, one of the recent items placed in production.



nets in the shop, finishing to match except when the finish is baked.

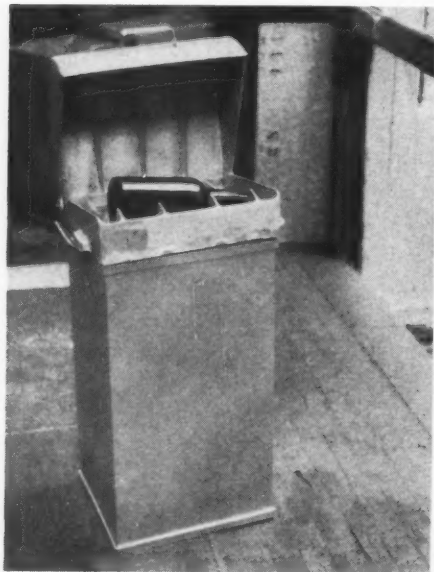
#### Liquor Bottle Breakers

The liquor bottle breakers shown in two of the photographs have been in steady production for some time. The can proper is built of 22-gauge black iron, spot welded and locked and formed with a special top rim which carries the cast iron lid. This lid has a special grid in each part on which the bottle is laid as shown. The lid is slammed shut; the grids break the bottle and the pieces fall into the can for later disposal. The cast iron lid is sent into the Brenner shop and requires only tight fitting to the can. After the lid and can are assembled the whole unit is spray painted with aluminum paint.

Machine guards of several types have been fabri-

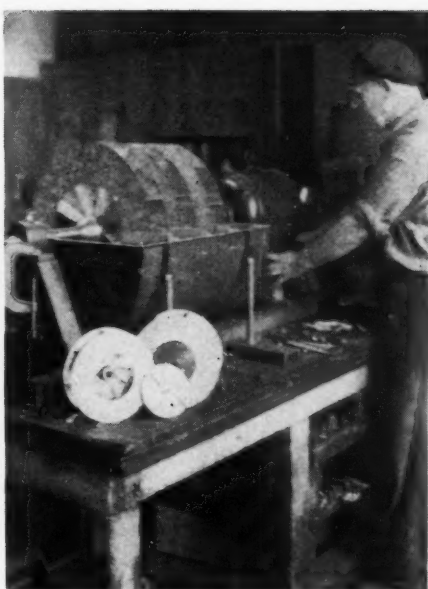
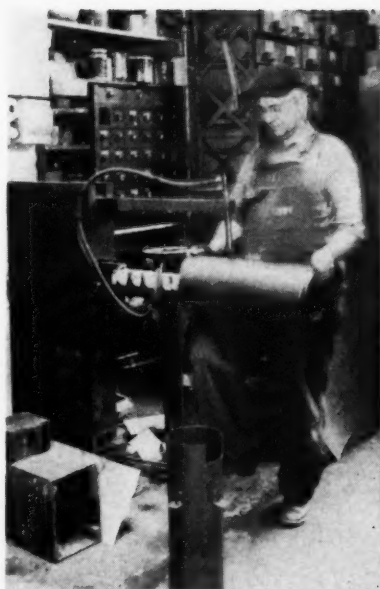
unpainted or painted. About fifty of these furnaces have been made each year since 1921. Square casings are made and baked outside the Brenner shop. The furnace castings are bought outside.

To make these furnaces forced air heating units, the firm buys housed blowers and builds the cabi-



Closeup of a single and overall view of a group of liquor bottle breakers showing the grids in the cast iron lids which break the bottle when the lid is dropped and the painted, black iron cans which Brenner fabricates.





Brenner mechanics are both specialists and all-around men. At the left—spot welding drums of a milking machine. Center—dynamically balancing an organ blower wheel in half its cabinet. Right—drill press cutting large hole through side of a machine guard.

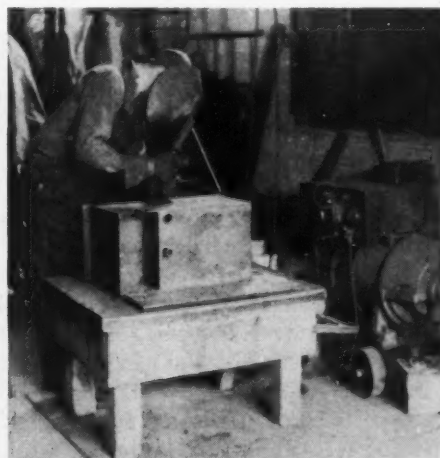
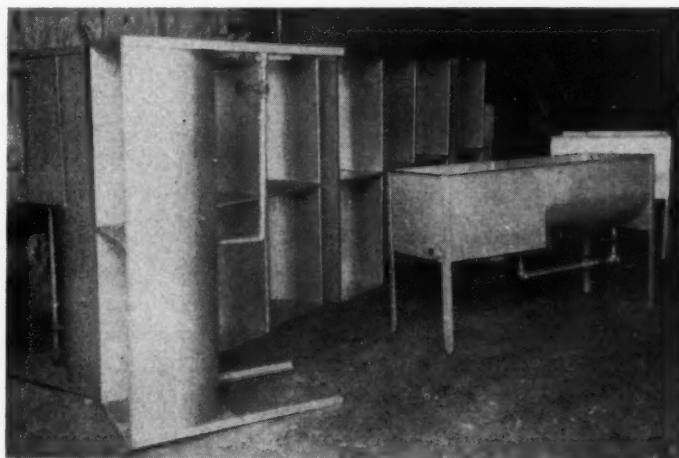
cated in the shop ever since the change over went into effect. At the present time a special guard is being made in quantities each month for a machinery manufacturer. This guard is built of solid, heavy plate on both faces with a large hole cut through each end. One of the photographs shows a drill press operator cutting such a hole with an ingenious rig which is slower than a shear but keeps an otherwise intermittent machine running practically all the time.

The two steel faces are joined by a band of sheet iron which is welded all around its perimeter. After welding, both edges are ground down smooth so that the guard looks like one piece of metal. These guards replace heavy and cumbersome cast iron guards used previously by the machinery manufacturer. The Brenner guards are also quite a bit cheaper and cannot be broken by rough handling. Some of the guards have two faces of expanded metal; assembly is the same, as is the finishing.

#### Milk Container Washers

Of a somewhat different nature and size are the milk container washers which have been in steady enough demand for several years that the shop makes up standard sizes during spare times, knowing that the finished washers will always be sold. These washers are of the two-compartment type demanded by sanitary authorities. One compartment contains a chlorine solution used for disinfecting, the other compartment is the washer or rinser. The "tubs" stand on an angle iron frame and legs and this frame supports a heater which may burn kerosene, gasoline or gas. Brenner does not make the heater, but builds the frame to take specified types of heaters and supplies the heater if desired by the buyer. Up to date more than one thousand of these washers have been fabricated and

*(Continued on page 144)*



At the left a group of aluminum painted milk container washers ready for crating and shipment. The unit on its legs shows the heater. Right—welder welding pieces of the housing which holds the milk container heater in place.

Examination of Mr. \_\_\_\_\_ Date \_\_\_\_\_  
 St. & No. \_\_\_\_\_ When and where born \_\_\_\_\_  
 State \_\_\_\_\_ Month \_\_\_\_\_ Day \_\_\_\_\_  
 How long have you been engaged in the industry, as mechanic's helper \_\_\_\_\_  
 Mechanic \_\_\_\_\_ Contractor \_\_\_\_\_  
 Engineer \_\_\_\_\_ Designer \_\_\_\_\_  
 Supervisor of Installations \_\_\_\_\_  
 Remarks: \_\_\_\_\_  
 What school, or schools, have you attended, or what is the extent of your technical training, under the branches of the industry for which you are seeking license to operate, \_\_\_\_\_  
 Have you read, and are you familiar with, the provisions of the present Warm Air Heating & Sheet Metal Code, Ordinance No. 1906 \_\_\_\_\_  
 Are you willing to subscribe to, and abide by, the provisions of this ordinance in the execution of work controlled by it, \_\_\_\_\_  
 By whom were you employed, and in what capacity during, \_\_\_\_\_  
 1935, \_\_\_\_\_  
 1936, \_\_\_\_\_  
 1937, \_\_\_\_\_  
 Under what firm name do you expect to operate, or by whom will you be employed if this license is granted, \_\_\_\_\_  
 Address St. & No. \_\_\_\_\_  
 Do you now maintain any shop, or place of business, \_\_\_\_\_  
 St. & No. \_\_\_\_\_  
 If not now, will you maintain a shop or place of business if this license is granted, \_\_\_\_\_  
 By whom are you now employed, \_\_\_\_\_  
 What are your duties, \_\_\_\_\_  
 What tools and equipment do you now possess, for use in the performance of the duties of Engineer, Designer, Installer, Supervisor of Installations, Contractor, Etc., for Sheet Metal, Gravity and Mechanical Warm Air Heating work, \_\_\_\_\_  
 List below, as complete as possible, the tools and equipment you expect to add, should this license be granted. \_\_\_\_\_

By H. J. Furge

Heating and Sheet Metal  
Inspector

Ft. Wayne, Ind.

## Our First 18 Months' Experience with THE FORT WAYNE CODE

THE heating ordinance of Fort Wayne, Indiana, under which contractors are licensed according to the type of work they are qualified to do, has now been in actual operation for about 18 months. This period has been a period of gradual development during which the little and big problems and the general procedure of enforcement have had to be worked out.

Our eighteen months experience under a licensing plan have brought forth several facts which may be of interest and value to other communities contemplating a similar ordinance. Many of the methods we have worked out in Fort Wayne can be applied only to our own conditions; other methods possibly can be used by other cities.

Without any thought of placing these problems in order of importance or according to their degree of irritation, the problem of organizing the inspection so that operating costs can be kept as low as possible so that the department can become self-supporting from the inspection fees received, always confronts the trade and the inspector early in the program.

In Fort Wayne, as those who have read the ordinance as published in American Artisan know, the

ordinance provides that every job of furnace, roofing, or sheet metal work excepting furnace cleaning must be done under a permit which is secured from the Department of Building. To secure this permit, the contractor must fill out an application which gives the location of the work and briefly what is proposed. While this is a detail and does not seem very important, we have found that for one reason or another many of these permits are not taken out. This will be explained a little farther along. During our first months of operation the contractor got his permit, started the job and, if it was a furnace, roughed in his stacks, hung the basement pipes or ducts and called for the first inspection. It was not absolutely necessary for the contractor to submit his heat loss calculations or a complete plan and, accordingly, the inspector had to take time to calculate heat losses and figure sizes and make a plan in order to check the contractor.

After first inspection the contractor set up his equipment, connected in his piping, hooked up the controls and, with the system ready for heat, called for the second inspection. If the system was satisfactory, heat was turned on and the final check was given to see that

Also, under our Fort Wayne laws, it is not necessary for the owner to tear out his present system and install according to our code if the owner cannot afford or does not wish to spend the money required for such alterations. But there is a joker in this situation. Supposing such a replacement has been made without doing anything but changing the furnace. Some rooms do not heat. The owner finally calls the inspector and claims the salesman told him all he needed was a new furnace. The salesman says he told the owner alterations were required. Who shall the inspector believe? We have not been able to answer that question after eighteen months of operation.

In explanation, this dope sheet must be filled in *completely by the contractor* when he applies for his permit. Note that the existing heating system is also covered in detail for replacement jobs. Note, also, that to fill in the sheet it is necessary for the salesman to check *every room* and figure the heat loss of every room. The inspector can take such a sheet, check the coefficients of heat transmission, check one or two rooms to see if the contractor is designing correctly (especially the contractor who knowingly or unknowingly does poor engineering), check register air temperatures, velocities and size of stacks, branches, regis-

Examination of Mr. .... for Gravity Warm Air Heating

1. What is meant by Gravity Warm Air Heating? Of what does it consist?.....
2. Name five (5) items required in the design procedure for a Gravity Warm Air Heating System .....
3. By what motive head does the Gravity Warm Air Heating System accomplish the desired purpose? .....
4. By what method are the load requirements of a Gravity Warm Air Heating System determined? .....
5. In what way does the Gravity Warm Air System, with cold air entirely from outside the building, differ from the system in which the cold air is taken entirely from within the building?.....
6. What is the H.B.F. (house basic factor) and the heat losses, and Leader Pipe Areas required to heat the building, plans for which are submitted herewith, if heating to 70° in zero weather, the building is standard frame construction; single glass, double hung windows (plain); asphalt shingle roof; all requirements to be minimum; and no directional or unusual exposure to be considered (figure each room separately).....
7. What is the Standard Code, recognized carrying capacity in B.T.U. per square inch of basement pipe leader where 175F. is used as a design register temperature. For 1st floor,..... 2nd Floor,..... 3d Floor,.....
8. What minimum grate area will be required to heat the building, as per plans submitted, and just figured, if the Combustion rate was 7.5 Lb. Per Sq. Ft. Per Hr.; Value of fuel 12,000 B.T.U. Per Lb.; Heating Unit efficiency of 60%; A factor of .860 being allowed for bad firing, accumulation of soot, ashes, etc.....
9. What relation does the cubic content of a room, or building, have to the leakage losses? .....
10. What percentage of a basement leader pipe area, is recognized as minimum standard free areas required in stacks leading to rooms above the 1st floor?.....

We believe that about 90 per cent of all work done

[illegible]

73



### Tabulation of Permits July 1 to Nov. 1, 1938, By Classes of Work

| Contractor Number—<br>and<br>Licenses<br>Granted<br>(See Note 2) | No. of<br>Old<br>Rea-<br>dence<br>Jobs | No. of<br>New<br>Ident-<br>ified or<br>Stores,<br>Etc. | No. of<br>New<br>Fur-<br>naces<br>Re-<br>paired | No. of<br>Fur-<br>naces<br>Re-<br>placed | No. of<br>Sheet<br>Metal<br>Jobs | No. of<br>Jobs of<br>Duct<br>Work<br>(Note<br>3) | No. of<br>Blowers<br>In-<br>stalled | No. of<br>Oil<br>Burners<br>In-<br>stalled | No. of<br>Gas<br>Burners<br>In-<br>stalled | No. of<br>Stokers<br>In-<br>stalled | Total<br>Selling<br>Price<br>of All<br>Work<br>Reported<br>in Period<br>(Note 1) |
|--|--|--|---|--|----------------------------------|--|-------------------------------------|--|--|-------------------------------------|--|
| 28<br>WA, SM, OB, S  | 0                                      | 3  | 0   | 0  | 0                                | 0  | 0                                   | 0  | 0  | 0                                   | 902.00   |
| 29<br>S  | 15                                     | 0  | 7   | 0  | 0                                | 0  | 0                                   | 0  | 0  | 25                                  | 7,800.00   |
| 30<br>WA, SM   | 5                                      | 0  | 0   | 1  | 2                                | 3  | 1                                   | 0  | 0  | 0                                   | 470.50   |
| 31<br>WA, SM, AC,<br>OB  | 16                                     | 0  | 2   | 1  | 2                                | 7  | 5                                   | 0  | 4  | 2                                   | 5,297.50   |
| 32<br>WA, SM   | 4                                      | 0  | 1   | 0  | 3                                | 0  | 3                                   | 1  | 0  | 0                                   | 241.30   |
| 33<br>WA, SM, OB,<br>GB, AC, S                                   | 2                                      | 5  | 0   | 3  | 2                                | 0  | 0                                   | 3  | 0  | 0                                   | 2,655.00   |
| 34<br>WA, SM   | 1                                      | 24   | 0   | 24                                       | 0                                | 0  | 7                                   | 23   | 10   | 0                                   | 7,271.00   |
| 35<br>WA, SM   | 0                                      | 1  | 0   | 0  | 0                                | 0  | 0                                   | 1  | 1  | 0                                   | 650.00   |
| 36<br>WA, SM   | 8                                      | 1  | 0   | 0  | 4                                | 3  | 5                                   | 1  | 0  | 0                                   | 698.30   |
| 37<br>WA, SM   | 5                                      | 0  | 0   | 1  | 1                                | 2  | 1                                   | 0  | 0  | 0                                   | 540.50   |
| 38<br>WA, SM   | 21                                     | 4  | 0   | 4  | 4                                | 10   | 4                                   | 10   | 6  | 0                                   | 5,044.00   |
| 39<br>S  | 3                                      | 0  | 1   | 0  | 0                                | 0  | 0                                   | 0  | 0  | 0                                   | 1,060.00   |
| 40<br>WA, SM   | 5                                      | 0  | 0   | 0  | 3                                | 1  | 5                                   | 0  | 0  | 0                                   | 255.50   |
| 41<br>WA, SM, AC,<br>OB, GB                                      | 16                                     | 2  | 2   | 10                                       | 8                                | 10   | 3                                   | 4  | 4  | 2                                   | 5,895.25   |
| 42<br>WA, SM   | 12                                     | 1  | 0   | 2  | 1                                | 5  | 6                                   | 0  | 1  | 0                                   | 1,847.50   |
| 43<br>WA, SM   | 4                                      | 1  | 0   | 0  | 1                                | 2  | 2                                   | 0  | 0  | 0                                   | 547.50   |
| 44<br>WA, SM   | 1                                      | 0  | 1   | 0  | 1                                | 1  | 1                                   | 0  | 0  | 0                                   | 208.00   |
| 45<br>WA, SM   | 1                                      | 0  | 0   | 0  | 0                                | 1  | 0                                   | 0  | 0  | 0                                   | 193.00   |
| 46<br>WA, SM   | 0                                      | 0  | 2   | 0  | 0                                | 0  | 2                                   | 0  | 0  | 0                                   | 136.80   |
| 47<br>WA, SM   | 39                                     | 2  | 0   | 3  | 0                                | 35   | 0                                   | 0  | 5  | 0                                   | 9,657.46   |
| 48<br>WA, SM   | 2                                      | 4  | 0   | 4  | 0                                | 2  | 0                                   | 1  | 2  | 2                                   | 1,780.00   |
| 49<br>S  | 2                                      | 0  | 3   | 0  | 0                                | 0  | 0                                   | 0  | 0  | 5                                   | 1,110.00   |
| 50<br>WA, SM, AC   | 0                                      | 0  | 1   | 0  | 0                                | 0  | 1                                   | 0  | 0  | 0                                   | 200.00   |
| 51<br>WA, SM   | 3                                      | 5  | 0   | 4  | 0                                | 2  | 0                                   | 2  | 8  | 4                                   | 3,033.00   |
| 52<br>S, WA  | 1                                      | 0  | 2   | 0  | 0                                | 0  | 0                                   | 0  | 0  | 0                                   | 1,575.00   |
| 53<br>WA, SM   | 20                                     | 4  | 0   | 4  | 3                                | 11   | 4                                   | 0  | 2  | 10                                  | 7,586.00   |

| Contractor Number—<br>and<br>Licenses<br>Granted<br>(See Note 2) | No. of<br>New<br>Resi-<br>dence<br>Jobs | No. of<br>Not<br>Identi-<br>fied or<br>Stores,<br>Etc. | No. of<br>New<br>Fur-<br>naces<br>In-<br>stalled | No. of<br>Fur-<br>naces<br>Re-<br>paired | No. of<br>Fur-<br>naces<br>Re-<br>placed | No. of<br>Sheet<br>Metal<br>Jobs | No. of<br>Jobs of<br>Duct<br>Work<br>Not<br>(3) | No. of<br>No. of<br>Blowers<br>In-<br>stalled | No. of<br>Oil<br>Burners<br>In-<br>stalled | No. of<br>Gas<br>Burners<br>In-<br>stalled | No. of<br>Stokers<br>In-<br>stalled | Total<br>Selling<br>Price<br>of All<br>Work<br>Reported<br>in Period<br>(Note 1) |
|--|---|--|--|--|--|----------------------------------|---|---|--|--|-------------------------------------|--|
| 1<br>WA, SM  | 10                                      | 0  | 0  | 1  | 3  | 8                                | 0   | 0   | 0  | 0  | 0                                   | \$ 649.50  |
| 2<br>WA, SM  | 2                                       | 3  | 0  | 3  | 0  | 1                                | 1   | 2   | 0  | 0  | 0                                   | 1,438.00   |
| 3<br>WA, SM, OB, S   | 14                                      | 14   | 0  | 11                                       | 0  | 14                               | 0   | 13  | 4  | 0  | 0                                   | 6,943.00   |
| 4<br>WA, SM  | 4                                       | 0  | 4  | 1  | 4  | 3                                | 2   | 1   | 2  | 0  | 0                                   | 4,346.50   |
| 5<br>WA, SM, GB, S   | 2                                       | 0  | 0  | 1  | 0  | 0                                | 0   | 0   | 0  | 2  | 0                                   | 310.00   |
| 6<br>OB, S   | 7                                       | 0  | 0  | 0  | 0  | 0                                | 0   | 0   | 5  | 2  | 0                                   | 550.00   |
| 7<br>WA, SM, AC,<br>OB, GB, S                                    | 7                                       | 1  | 0  | 1  | 0  | 4                                | 0   | 0   | 4  | 3  | 4                                   | 2,479.50   |
| 8<br>WA, SM  | 41                                      | 0  | 0  | 1  | 0  | 38                               | 0   | 1   | 3  | 0  | 0                                   | 7,643.11   |
| 9<br>WA, SM, OB,<br>GB, AC, S                                    | 2                                       | 2  | 0  | 2  | 0  | 0                                | 0   | 0   | 4  | 0  | 0                                   | 1,555.00   |
| 10<br>WA, SM   | 5                                       | 21   | 0  | 21                                       | 0  | 3                                | 0   | 6   | 11   | 0  | 15                                  | 9,786.00   |
| 11<br>WA, AC, OB, S  | 2                                       | 3  | 0  | 5  | 0  | 0                                | 0   | 0   | 5  | 1  | 4                                   | 1,370.00   |
| 12<br>WA, SM, OB, S  | 4                                       | 4  | 3  | 3  | 0  | 4                                | 0   | 3   | 0  | 2  | 0                                   | 2,050.00   |
| 13<br>WA, SM   | 9                                       | 0  | 3  | 0  | 0  | 3                                | 6   | 0   | 2  | 0  | 0                                   | 7,255.00   |
| 14<br>GB   | 73                                      | 5  | 7  | 8  | 0  | 6                                | 0   | 0   | 4  | 4  | 50                                  | 16,430.00  |
| 15<br>S  | 19                                      | 0  | 3  | 1  | 0  | 0                                | 0   | 0   | 0  | 0  | 0                                   | 8,120.00   |
| 16<br>S  | 2                                       | 0  | 1  | 0  | 0  | 0                                | 0   | 0   | 0  | 0  | 3                                   | 3,150.00   |
| 17<br>S, OB  | 18                                      | 1  | 5  | 0  | 0  | 0                                | 0   | 0   | 0  | 0  | 23                                  | 6,745.00   |
| 18<br>GB   | 3                                       | 0  | 0  | 0  | 0  | 0                                | 0   | 0   | 0  | 3  | 0                                   | 549.50   |
| 19<br>WA, SM   | 19                                      | 0  | 0  | 0  | 0  | 6                                | 13  | 0   | 1  | 1  | 0                                   | 1,991.50   |
| 20<br>OB, S, AC  | 4                                       | 0  | 0  | 0  | 0  | 0                                | 0   | 0   | 0  | 0  | 4                                   | 718.00   |
| 21<br>WA, SM   | 14                                      | 0  | 2  | 1  | 1  | 0                                | 8   | 7   | 0  | 1  | 0                                   | 746.50   |
| 22<br>WA, SM   | 3                                       | 1  | 0  | 1  | 0  | 3                                | 0   | 2   | 0  | 1  | 0                                   | 755.00   |
| 23<br>WA   | 1                                       | 0  | 0  | 0  | 1  | 0                                | 1   | 0   | 0  | 0  | 0                                   | 90.00  |
| 24<br>WA, SM   | 8                                       | 0  | 0  | 0  | 0  | 8                                | 0   | 0   | 1  | 0  | 0                                   | 1,339.50   |
| 25<br>WA, SM   | 9                                       | 0  | 0  | 0  | 0  | 3                                | 5   | 0   | 0  | 0  | 0                                   | 1,054.50   |
| 26<br>WA, SM   | 0                                       | 3  | 0  | 2  | 0  | 0                                | 0   | 1   | 0  | 0  | 0                                   | 489.00   |
| 27<br>WA, SM   | 11                                      | 0  | 1  | 0  | 8  | 0                                | 8   | 2   | 3  | 1  | 0                                   | 2,312.00   |

| Contractor<br>Number—<br>and<br>Licenses<br>Granted<br>(See Note 2) | No.<br>of<br>Old<br>Resi-<br>dence<br>Jobs | No.<br>of<br>New<br>Resi-<br>dence<br>Jobs | No.<br>of<br>Not<br>Identi-<br>fied or<br>Stores,<br>Etc. | No.<br>of<br>New<br>Fur-<br>naces<br>In-<br>stalled | No.<br>of<br>Fur-<br>naces<br>Re-<br>placed | No.<br>of<br>Fur-<br>naces<br>Re-<br>set | No.<br>of<br>Sheet<br>Metal<br>Jobs | No.<br>of<br>Jobs of<br>Duct<br>Work<br>(Note<br>3) | No.<br>of<br>Blowers<br>In-<br>stalled | No.<br>of<br>Oil<br>Burners<br>In-<br>stalled | No.<br>of<br>Gas<br>Burners<br>In-<br>stalled | No.<br>of<br>Stokers<br>In-<br>stalled | Total<br>Selling<br>Price<br>of All<br>Work<br>Reported<br>in Period<br>(Note 1) |
|---|--|--|---|---|---|--|-------------------------------------|---|--|---|---|--|--|
| 54<br>WA, SM  | 7  | 0  | 0   | 0   | 5   | 2  | 5                                   | 0   | 0                                      | 0   | 0   | 0                                      | 592.50   |
| 55<br>WA, SM  | 3  | 1  | 0   | 0   | 1   | 1  | 0                                   | 2   | 0                                      | 0   | 0   | 0                                      | 246.50   |
| 56<br>WA, SM  | 0  | 0  | 1   | 0   | 0   | 0  | 0                                   | 1   | 0                                      | 0   | 0   | 0                                      | 500.00   |
| 57<br>WA, SM  | 10   | 0  | 0   | 0   | 7   | 0  | 8                                   | 2   | 0                                      | 0   | 0   | 0                                      | 423.50   |
| 58<br>WA, SM, AC  | 1  | 1  | 0   | 0   | 1   | 1  | 0                                   | 0   | 1                                      | 0   | 0   | 0                                      | 375.00   |
| 59<br>GB  | 22   | 0  | 0   | 2   | 0   | 0  | 0                                   | 0   | 0                                      | 0   | 22  | 0                                      | 4,145.00   |
| 60<br>S, OB, GB   | 2  | 0  | 0   | 0   | 0   | 0  | 0                                   | 0   | 0                                      | 0   | 2   | 0                                      | 370.00   |
| Totals  | 524  | 117  | 53  | 120   | 70  | 165                                      | 112                                 | 81  | 102                                    | 27  | 151   | 96                                     | \$166,549.78   |

1. Covers total selling price of all jobs without breakdown into classes of installations covered.  
2. Contractors have been deliberately shuffled so there is no sequence alphabetically, by class of work, volume of business, etc.  
3. Compare with number of furnaces (old house—repair, replace). Shows surprising number of jobs where no alterations were made to existing pipe work.

is handled legitimately because home owners have learned that only under a permit can a job be inspected and approved and that only with such approval does the owner have any recourse on the contractor. However, we do have contractors who, for one reason or another, try to avoid the ordinance. These men try to persuade the owner that if they are given the job without a permit, in other words keep the work a secret, the contractor can do the work at a much lower price, whereas if some other contractor is called in to figure, the first contractor will have to report the job, the installation will have to be made according to the strict regulations of our code and so will cost a whole lot more money. Some owners fall for this argument, until the job fails to perform and then the screams are really something.

### Code Compliance Diagnosed

After eighteen months of operation, we have found that the contractors in Fort Wayne divide themselves roughly into three groups. In group one we have those men who comply with our ordinance 100 per cent. They take out all permits for work they do. They report on all jobs they lose. They fill in a dope sheet or furnish a complete set of plans for new houses and for replacement work as well. With these contractors we have no trouble.

In group two we have those contractors we rate at 50 per cent because they fail to take out some permits because they are careless; they neglect the report sheets

and thus do not cooperate; they fill in dope sheets or make plans for important jobs but neglect smaller work unless reminded. They want to comply, but they are careless.

Group three constitutes our headache. We have to be after these men all the time. The only time they take out a permit is when the owner insists; they try to sell work without a permit, thereby conniving with the owner; they do not make reports and try by every possible subterfuge to avoid the ordinance. They deliver material at night so their trucks will not be seen loaded during the daytime and thus be followed. If the trucks are spotted and know they are being followed they head for the city limits and on out into the country. The work they do, generally speaking, is on a par with the scheming they employ.

These men want the ordinance enforced upon everyone but themselves. They will take out permits in their name for men or firms who are not licensed. So long as they get the work of these unlicensed operators, everything is lovely, but let these unlicensed firms give work to someone else (usually another conniver) and the first conniver is on our doorstep wanting the job stopped.

### Codes Can't Succeed Without Association Backing

And right here let me say that I believe that a code is a physical impossibility in any city where the ordinance does not have the support of an active and interested local association of contractors. A majority of men in the trade have to be in favor of the ordinance if the ordinance is to have any chance of survival. We believe, here in Fort Wayne, that if 30 per cent of the contractors live up to the law the other 70 per cent

(Continued on page 136)

Examination of....., for Mechanical Warm Air Heating.

1. When does the Gravity System cease to bear such distinction, and classify as a Mechanical System? .....
2. Give at least (5) Five separate advantages to be had in the Mechanical System over the Gravity System.....
2. What advantage if any, is found in placing baffles inside the casing of a Gravity unit, when it is converted into a mechanical system, and what type baffle would you use? .....
4. Name at least three (3) separate types of heat found in a heating system: .....
5. Name two (2) separate and distinct systems found in the heating system, most essential to the success of the system, which must function side by side for comfort? .....
6. Is the same sized unit, or grate area, required to heat a given building by the mechanical system as for Gravity, and why?.....
7. Explain in your own words, why automatic controls are required on all mechanical equipment and name Five (5) advantages to be obtained by their use? .....
8. Are the dampers used in gravity work, suitable for mechanical work? What type are required, and why?.....
9. Why is the centrifugal type fan preferred against the propeller type fan for mechanical work? .....
10. Using the same plan as used for the gravity examination with specifications as listed below, figure the requirements for a Mechanical job in the same building. Design Register temperature 150° F; Register Velocity 350 CFM; Stack Velocity 500 CFM; Leader Velocity 575 CFM; Main Duct Velocity 650 CFM.

All Windows to be double hung with storm sash. All Doors to have storm doors. All outside walls and cold ceilings to be insulated with 3½" rock wool. Asphalt shingle roof. The design temperature to be 70F, inside at 10F, below zero, outside. Consider all rooms the same. Do not consider any directional or unusual exposure in your calculations. You may use either the attached data sheet or any you may desire to express the proper calculations.

# Metal Roofing and Puttyless Skylights on New York's Historical Museum

In this large sheet metal contract, some 15,000 square feet of puttyless skylight, 11,000 square feet of standing seam and flat locked Monel roofing and 10,000 square feet of built-up roofing were required for the roof. Standard practice was followed throughout.

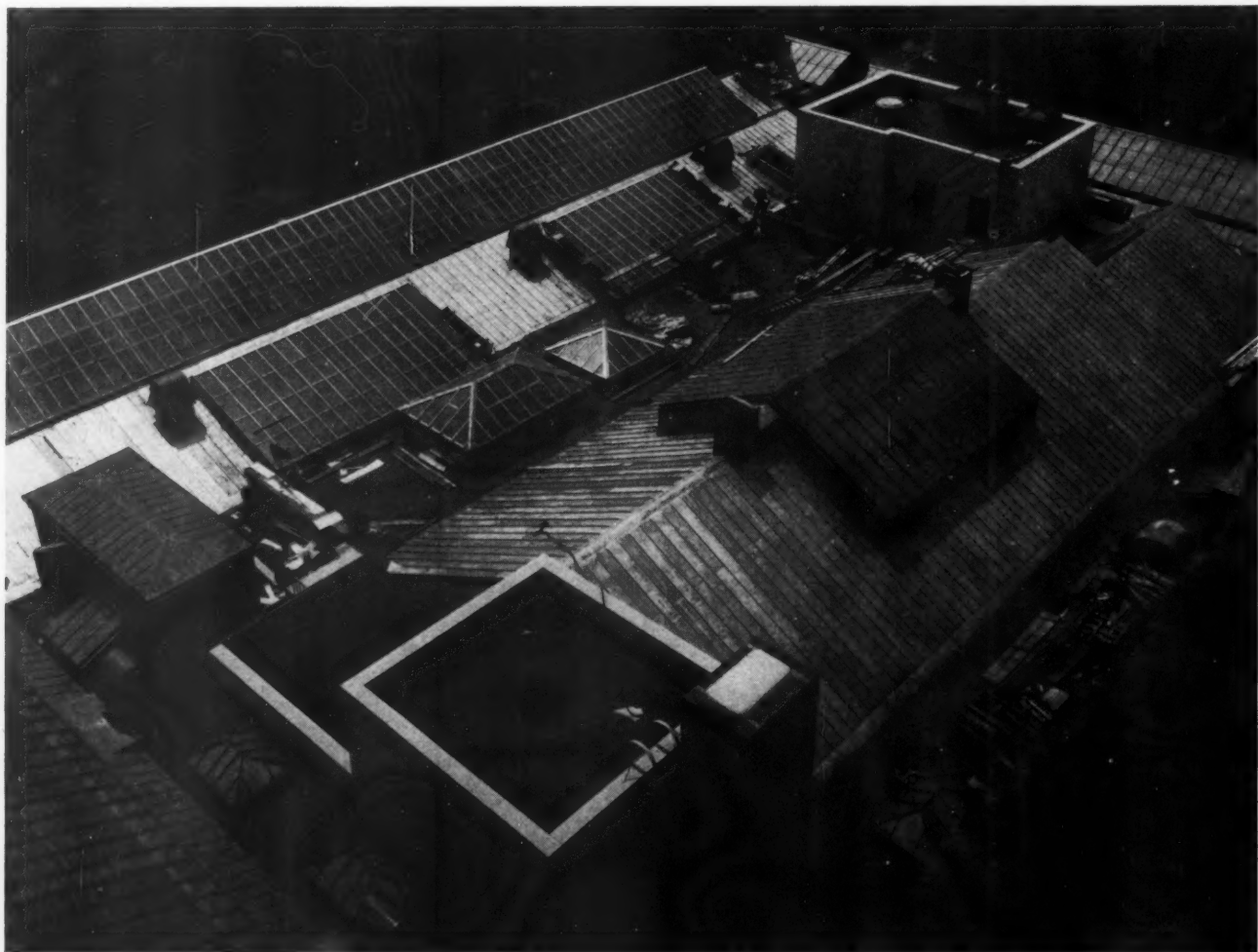
By R. C. Nason

CARRYING out the present tendency of museums to provide good lighting for exhibiting their art treasures, the executives of New York City's Historical Museum recently had their roof provided with some 15,000 square feet of puttyless skylights. As the gross roof area is about 36,000 square feet, the new lighting covers nearly one-half of the total roof area.

Most of the sheet metal used in the alterations is

Monel, although several copper air conditioning ventilator tops and 20-oz. copper cornice cresting provide an attractive contrast in materials as well as color. Metal ribs, connection pieces and ridge capping of skylights are Monel, as also is the 11,000 square feet of flat and standing seam roofing. A balance, involving some 10,000 square feet, is built-up roofing.

The contract for the skylight and sheet metal work



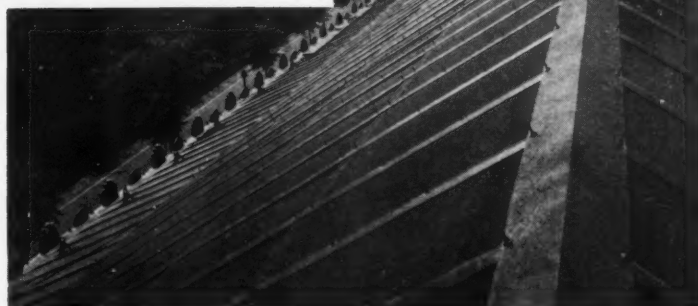
This view, looking down on the roof area, shows the three enormous skylights along the three exposed frontages and a fourth skylight straddling the standing seam, central roof. The standing seam roofs are standard construction, other photographs show the skylights to better advantage.





Left—Standing on the roof, the central, ridged section shows its construction—standing seam in alternate, full length sheets, with a wide turn over for the gable. A skylight straddles the ridge.

Right—Looking along the ridge of a frontage skylight, this photograph shows how the glass lights are lapped along horizontal joints and the eave to ridge caps which cover the vertical joints. This view also shows the copper ornaments along the cornice.



on the enlarged Historical Society building was handled by J. J. Fisher Co., Brooklyn, N. Y. The altered building has 200 feet frontage. One side is 185 feet and another 175 feet, while the fourth side abuts other buildings. In planning lighting and roof coverage, the architects designed an elevated, pitched area around the three exposed sides, this chiefly for the accommodation of the skylighting, while the interior area is flat. Skylights straddle roof ridges but there is an exterior area of some 20 feet depth, which was surfaced with standing seam Monel. The sheet metal work runs uninterrupted from skylight base lines to gutters.

Embellishment of gutter fronting was provided with 575 feet of Miller & Doing's stamped copper cresting,

pieces being 20 inches high. In addition to the major skylighting, which runs around the exposed building sides, as shown, there are 18 other smaller skylights of varying shape, size and design installed by the same contractor within the area bounded by main skylight areas on ridges.

#### Metal Roof Construction

In roofing the contractor carried out the customary practice in this district of installing standing seam work on pitched surfaces and flat, soldered seams for flat surfaces. At least one notable exception occurs, however; this is in connection with building corners. Here



The museum is 200 feet wide with sides 185 and 175 feet deep. Cornice ornamentation is shown on two sides.



Bronze snow guard rail, standing seam roofing and lower edge of a skylight show in this view along the front.

there are two passages, or walks, per corner, all flashed and covered with flat seam. The functions of the narrow passageways, 20 inches wide each, are twofold. First, they aid in drainage, particularly during snowy periods and, second, they provide means of examining and servicing roofing and gutters.

#### Snow and Rain Precautions

Good drainage and protection against snow slides is unquestionably a special feature of the covering of this building. The major gutter width is 3 feet, this along the front side. Gutters along the other two sides average 2½ feet wide. Bronze snow rails of 1-inch heavy rigid pipe, further protect pedestrians and gutters alike.

#### Special Type of Skylight

The contractor used his own special type of putty-less skylight wherein wire-glass individual lights overlap top and bottom. This, according to the Fisher Co., insures tightness and also provides ready accessibility in case repairs are needed. As ribs, as well as ridge caps, are bolted to identical interior pieces with Monel bolts, nuts and washers, there is thus offered an easy path to service should any be necessary.

The wire reinforcement incorporated in the glass was held insufficient protection in two cases, notably the area of the restorers' workshop and over a rear office on the first floor. These areas were provided with heavy, coarse wire guards. The office, located in a rear, three-sided court, has a long, louvred ventilation fan intake which runs 50 feet around the court sides. A

flat seam Monel roof, the same metal for louvers, plus guttering and exterior leaders, are additional points.

In connection with skylights as large as these, support must be given prime consideration. The smaller lights here are self supporting, but for the larger units and what might be regarded as the continuous, major lighting, 8-in. steel I-beam framing was provided. Insulation between the Monel and steel work was provided for by the use of 30-pound roofing felt padding and Monel clips that were tinned at contact points.

#### Ventilating System Accessories

Although the Historical Society building was air conditioned by another contractor (Baker-Smith & Co., New York City) the Fisher company made and installed two louvred air discharge houses on the roof. One unit is 20 feet square by 8 feet high, with louvres on four sides. A smaller vent of the same general type is three-sided and abuts an interior tower wall. The conditioning contractor also installed several copper air discharge tops. Altogether about 20 tons of Monel metal were required, plus several thousands bolts, nuts and washers of the same material.

**Editor's Note**—This is the third large New York public building metal roof described—the Metropolitan Museum (Feb., 1937); the New York Public Library (July, 1936). New York, it would seem, is roofing its public buildings for permanence.



Down on the roof, inside the front skylight, several ventilating system accessories, small skylights and an excellent closeup of the standing seam roof of the central roof.

# Price per Opening Survey of 40 Cities

The following four pages show what is furnished for the price per opening prevailing in each of the cities covered by the survey.

**T**HERE has been much argument, pro and con, these past few years over Price per Opening, a practice of pricing metal work used in heating systems based upon a flat quotation of so many dollars for each opening.

Two opposing camps have arisen. One group says that it is possible to generalize the amount of material or labor required for an installation accurately enough so that if the number of openings are known an immediate cost of material and labor is established. The assumption must be, of course, that in the long run jobs equalize themselves so that installations requiring more material or more labor than average are offset by jobs requiring less material or labor.

Opposing these are the contractors who say that no two installations are alike. The contractor never knows how many extra, expensive fittings will be needed; labor is always uncertain and must be calculated metal section by metal section; there must always be extra expenses which only detailed estimating can take into account.

## What the "No's" Say

The thinking of the men opposed to price per opening is probably expressed by H. A. Daniel, Atlas Roofing Co., Newburgh, N. Y., who wrote: "It is all right for the dry goods man to price his calico by the yard or the hardware man to price his nails by the pound, since the first rolls out the calico and measures it and the second picks up the nails and weighs them, but it is utterly impossible to figure accurately and blindly on air conditioning work because things are different on every job. The contractor who quotes on this basis is offering the buyer the knife to cut the contractor's throat on the next job which comes along and making it impossible to increase prices when conditions necessitate an increase. Even in two houses which are apparently alike variations will be found which may make a difference of 100 per cent in labor cost. If we could dish out collars, elbows, boots and registers of a uniform size and type and houses were all about the same floor plan there might be some sense in quoting price per opening, but so long as installations are different we should figure each job individually. A price per opening may mean one thing to one man and something entirely different to the next. On a chiseller's bid the bill for extras may easily amount to more than the difference in the original bids. Such short cuts as price per open-

ing only help the incompetent to break down prevailing prices."

## And the "Yes'es" Say

No one contractor has summarized the reasons behind the use of price per opening, but during the past year the editors have handled a surprising volume of correspondence on this subject and from this exchange some interesting reasons for the prevailing popularity have come to light. Also, as a result of this correspondence, the idea was born to gather facts relating to price per opening and publish these findings—the result is the tabulation which accompanies this article.

Of foremost importance, the tabulation shows that only in a few instances are contractors using price per opening in old house work. Everyone seems to realize that old house work is fraught with hazard and that only by a careful survey can any contractor hope to make a profit from the old house. Therefore, the opponents of price per opening should remember that the greatest hazard in contracting is automatically removed by most installers.

Secondly, applied to new house work only, contractors report that there is a surprising similarity between new houses. Houses erected by a builder are apt to be about the same size, of the same general plan, and are more or less standardized all the way through. Once a heating system has been worked out for one house the same general conditions are apt to prevail in all the others. Changes such as different locations of the furnace or registers, contractors report, tend to balance themselves so long as the houses are similar.

## Is There Any Uniformity in Jobs?

A contractor in the Chicago area, becoming interested in this question, kept labor and material records of all house work for 1938. To the contractor's surprise his installations figured out closely at 56 or 60 pounds of iron to the opening. Of course the houses varied, but straight sections tended to balance out with the differences appearing in the fittings. Applying a little judicious planning, this contractor found he was able to keep even the fittings within a narrow range of sizes and types.

Numerous contractors report that the large variation comes in the item of labor. However, even



# Price per Opening Resume—

| State         | City               | Mechanics Wage Scale,<br>Per Day or Hour | Helpers Wage Scale,<br>Per Day or Hour | Number Helpers Per-<br>mitted to Each Mechanic | Shops Reporting are<br>Union or Non-Union | Price Per<br>Opening (P/O)   | Does P/O<br>Cover  |                    |                | Does P/O<br>Apply to | Does P/O<br>Include  |                                | Is Cost of Furnace and<br>Blower Included in P/O | % Added for Profit to Net<br>Cost of Furnace and Blower | Is Cost of Controls<br>Included in P/O | % Added for Profit to<br>Net Cost of Controls | Is Installation of<br>Controls Included in P/O | How Do Electricians Charge for<br>Installation of Controls (Note 2) | % Added for Profit to Elec-<br>tricians' Charge for Wiring             | Electrician's Charge for<br>Electrical Wiring on a<br>Forced Air System<br>Using a— |                       |                      |                         | On Oil-Fired Furnaces<br>Does P/O Include— |   |                                   |                                    | Are Registers<br>Included in P/O | % Added for Profit to |            |            |
|---------------|--------------------|--|--|--|---|------------------------------|--------------------|--------------------|----------------|----------------------|--|--------------------------------|--|---|--|---|--|---|--|---|-----------------------|----------------------|-------------------------|--|---|-----------------------------------|------------------------------------|----------------------------------|-----------------------|------------|------------|
|               |                    |  |  |  |   |                              | New<br>House Work  | Old<br>House Work  | Either<br>Type |                      | Measuring up<br>the House  | Making a Plan<br>to Give Buyer |  |   |  |   |  |   |  | Gas-Fired<br>Unit   | Oil-Fired<br>Unit     | Stoker-Fired<br>Unit | Hand-Fired<br>Coal Unit | Cost and Setting<br>an Inside Oil Tank     | Cost and Setting<br>an Outside Oil Tank | Charge for Setting<br>Inside Tank | Charge for Setting<br>Outside Tank |                                  |                       |            |            |
| California    | Pasadena . . . . . | \$8.00                                   | \$4.00 to<br>\$ 6.25                   | 1  | Union                                     | \$20.00                      | Yes                | No                 | No             | Yes                  | —  | —                              | No   | —   | Yes                                    | —   | —  | —   | —  | —   | —                     | —                    | —                       | —  | —                                       | —                                 | —                                  | Yes                              | —                     |            |            |
| Connecticut   | Hartford . . . . . | \$ 75-<br>\$1.25                         | \$ 40-<br>\$ 60                        | Open   | Non-<br>Union                             | \$18-<br>\$21                | Yes                | No                 | No             | Yes                  | ←  | No                             | Yes  | No  | 33 1/3                                 | No  | —  | No  | a; \$15  | —   | —                     | \$70                 | —                       | —  | Yes                                     | No                                | —                                  | —                                | Yes                   | 40         |            |
| Illinois      | Alton . . . . .    | \$1.25                                   | \$ 80                                  | No   | Union                                     | \$20                         | Yes                | Yes                | Yes            | No                   | \$20-<br>First;<br>\$35-<br>Second   | —                              | Yes  | No  | No                                     | 30  | No   | 30  | No   | a; \$25   | 10                    | \$25                 | \$25                    | \$25                                       | \$20                                    | No                                | No                                 | \$45                             | \$138                 | No         | 30         |
|               | Chicago Heights    | \$1.70                                   | —                                      | Not al-<br>lowed                               | Union                                     | \$17-<br>\$20                | Yes                | —                  | —              | Yes                  | —  | Yes                            | Yes  | No  | 20                                     | No  | 20   | No  | a; Varies  | 20  | \$15-<br>\$25         | \$14-<br>\$21        | —                       | —  | No                                      | No                                | \$5                                | \$12                             | Yes                   | 20         |            |
|               | Du Page Co. . .    | \$1.70                                   | —                                      | —  | Non-<br>Union                             | \$20                         | Yes                | Yes                | Yes            | Yes                  | ←  | Yes                            | Yes  | No  | 50                                     | No  | 50   | No  | c  | 50  | \$8-<br>\$10          | —                    | \$10                    | \$8  | No                                      | No                                | —                                  | —                                | Yes                   | 50         |            |
|               | Peoria . . . . .   | \$1.375<br>\$1.025                       | \$85 to<br>\$1.025                     | 1  | Union                                     | \$18                         | Yes                | —                  | —              | No                   | \$18-<br>First<br>\$32-<br>Second  | —                              | Yes  | Yes   | No                                     | 40  | No   | 40  | No   | a; \$10 on<br>grav-<br>ity—<br>\$20,<br>F.A.  | 40                    | \$20                 | \$20                    | —  | No                                      | —                                 | —                                  | —                                | Yes                   | ←          |            |
| Indiana       | East Chicago...    | \$1.50                                   | —                                      | 1 to 4   | Non-<br>Union                             | \$40                         | →                  | →                  | Yes            | Yes                  | ←  | Yes                            | —  | Yes   | 10                                     | Yes   | 10   | Yes   | —  | 10  | \$30                  | \$30                 | \$25                    | \$20                                       | No                                      | No                                | \$55                               | \$75                             | Yes                   | 10         |            |
|               | Ft. Wayne.....     | \$1.00                                   | \$ 50                                  | Open   | Union                                     | \$23                         | Yes                | No                 | No             | Yes                  | ←  | No                             | No   | No  | 45                                     | No  | 45   | No  | a; \$20  | 10  | \$20                  | \$20                 | \$20                    | \$12                                       | No                                      | No                                | —                                  | —                                | No                    | 30         |            |
|               | Hammond.....       | \$1.50                                   | \$1.00                                 | 1 to 4   | Union                                     | \$22 to<br>\$30              | \$22               | \$30               | ←              | No                   | Add<br>\$15 for<br>Second  | —                              | Yes  | Yes   | No                                     | 12  | No   | 12  | No   | a; \$20   | 12                    | \$25                 | \$25                    | \$25                                       | \$20                                    | No                                | No                                 | \$35 <sup>a</sup>                | —                     | Yes        | 12         |
|               | South Bend....     | \$1.125                                  | \$ 60                                  | 1  | Union                                     | \$15 to<br>\$40,<br>av. \$20 | \$15<br>to<br>\$30 | \$18<br>to<br>\$40 | ←              | No                   | \$15 to<br>\$25,<br>first;<br>\$18 to<br>\$40,<br>second   | —                              | Yes  | Yes   | No                                     | 0-40  | No   | 0-40  | No   | a; \$20<br>and b;<br>\$1.50   | 0-25                  | \$20-<br>\$25        | \$20                    | \$20                                       | \$15                                    | No                                | No                                 | \$10-<br>\$85                    | \$20-<br>\$115        | Yes        | List<br>40 |
|               | Terre Haute...     | \$1.10                                   | \$ 65                                  | 1  | Union                                     | \$12 to<br>\$15              | Yes                | No                 | ←              | Yes                  | ←  | Yes                            | Yes  | No  | 33 1/3                                 | No  | 25   | No  | b  | 10  | —                     | \$25                 | \$25                    | \$5 to<br>\$10                             | No                                      | No                                | ?                                  | ?                                | Yes                   | 33         |            |
| Iowa          | Sioux City.....    | \$1.00                                   | —                                      | 1 to shop                                      | Union                                     | \$38                         | Yes                | No                 | ←              | Yes                  | ←  | Yes                            | Yes  | No  | List                                   | No  | List   | No  | c  | 0   | \$10 to<br>\$15       | ?                    | ?                       | ?  | ?                                       | ?                                 | ?                                  | ?                                | ?                     | Yes        | 20         |
| Maryland      | Cumberland...      | \$ 75                                    | \$ 50                                  | Yes  | Union                                     | \$40 to<br>\$45              | Yes                | No                 | ←              | Yes                  | ←  | Yes                            | Yes  | Yes   | 40-<br>50                              | Yes   | 40-50  | Yes   | ←  | 40-50   | ?                     | ?                    | ?                       | ?  | —                                       | —                                 | —                                  | —                                | Yes                   | 40         |            |
| Massachusetts | Lynn.....          | \$1.375                                  | \$15 a<br>week                         | 1/2  | Union                                     | \$22                         | Yes                | No                 | ←              | Yes                  | ←  | No                             | Yes  | No  | 20                                     | No  | 20   | No  | a; \$35  | 20  | Gas<br>Co.            | \$35                 | ?                       | \$22                                       | No                                      | No                                | \$35                               | ?                                | Yes                   | ←          |            |
| Michigan      | Detroit.....       | \$1-<br>\$1.25                           | \$ 50-<br>\$ 75                        | —  | Union                                     | \$11 to<br>\$15              | Yes                | No                 | ←              | Yes                  | ←  | Sometimes<br>No                | Yes  | No  | 20                                     | No  | 20   | No  | a; \$16  | 10 to<br>20   | \$16-<br>\$20         | \$20                 | —                       | \$16                                       | No                                      | No                                | \$25 <sup>a</sup>                  | \$40 <sup>a</sup>                | Yes                   | 25         |            |
|               | Lansing.....       | \$ 75<br>\$1.00                          | \$ 60                                  | —  | Non-<br>Union                             | \$12 to<br>\$20              | Yes                | —                  | —              | Yes                  | ←  | Yes                            | Yes  | No  | 33 1/3 to 40                           | No  | 40   | No  | b;<br>\$1.25   | 33 1/3  | \$4.50<br>-\$10       | \$7.50<br>-\$9       | \$5                     | \$4.50<br>-\$7                             | No                                      | No                                | \$45                               | —                                | Yes                   | 0-25       |            |
| Minnesota     | E. Grand Forks     | \$ 70                                    | \$ 40                                  | —  | Non-<br>Union                             | \$18                         | Yes                | No                 | ←              | Yes                  | ←  | Yes                            | No   | No  | 10                                     | No  | 10   | No  | b;<br>\$1.25   | 10  | —                     | —                    | —                       | —  | No                                      | No                                | \$15                               | —                                | Yes                   | 50         |            |
| Missouri      | Kansas City...     | \$ 85                                    | \$ 40-<br>\$ 60                        | —  | Non-<br>Union                             | \$15-<br>\$16 <sup>7</sup>   | Yes                | Yes                | ←              | Yes                  | ←  | No                             | Yes <sup>8</sup>                                 | No  | 30                                     | No  | 30   | Yes   | a; \$15 to \$20,<br>F.A.—<br>\$10 to<br>\$15 Gravity<br>a; \$8 to \$12 | 10  | \$15-<br>\$20         | \$15-<br>\$20        | \$15-<br>\$20           | \$10-<br>\$15                              | No                                      | No                                | ?                                  | \$25                             | Yes                   | 30         |            |
|               | St. Louis.....     | \$ 65-<br>\$ 70                          | \$ 40                                  | —  | Non-<br>Union                             | \$11-<br>\$13                | Yes                | No                 | ←              | No                   | \$12-<br>First <sup>15</sup><br>\$14-<br>second  | —                              | Yes  | No  | No                                     | 0-5   | No   | 0-5   | No   | a; \$8 to \$12  | 0                     | \$6-<br>\$16         | ?                       | \$14-<br>\$22                              | \$6-<br>\$12                            | No                                | No                                 | —                                | —                     | Yes        | 0          |
| New Hampshire | Nashua.....        | \$ 80                                    | \$ 55                                  | —  | Non-<br>Union                             | \$17.50<br>-\$22             | Yes                | No                 | ←              | No                   | \$17.50<br>First<br>\$22-<br>second  | —                              | Yes  | Yes   | No                                     | 40  | No   | 40  | No   | a; varies   | 15                    | ?                    | \$15                    | \$10                                       | —                                       | No                                | No                                 | \$40                             | —                     | Yes        | 40         |
| New Mexico    | Albuquerque...     | \$7-\$9                                  | \$4                                    | 1  | Union                                     | \$17                         | Yes                | Yes                | Yes            | Yes                  | ←  | Yes                            | No   | No  | 10                                     | No  | 10   | No  | a; \$10  | 10  | 10                    | None                 | —                       | —  | —                                       | —                                 | —                                  | —                                | Yes                   | List       |            |
| New York      | Batavia.....       | \$1.75                                   | \$ 90                                  | 1  | Union                                     | \$11-<br>\$14                | \$11-<br>\$17      | \$14-<br>\$27      | ←              | No                   | New \$11-<br>First<br>\$14-<br>second<br>\$17-<br>third<br>\$14-<br>first<br>\$21-<br>second<br>\$27-<br>third | —                              | Yes  | Yes   | No                                     | 50  | No   | In-<br>clud-<br>ed in<br>fur-<br>nace<br>price                      | No   | c;<br>aver-<br>ages<br>\$12 a<br>job  | 0                     | \$12                 | ?                       | —  | —                                       | —                                 | —                                  | —                                | —                     | No         | 20         |
|               | Buffalo.....       | \$1.30                                   | \$ 75                                  | 1 to 4   | Union                                     | \$22                         | Yes                | No                 | No             | —                    | —  | Yes                            | Yes  | No  | 40                                     | No  | 40   | No  | Contract   | 10  | \$15-<br>\$20<br>\$35 | \$18-<br>\$22<br>?   | ?                       | \$10-<br>\$15<br>?                         | No                                      | No                                | With<br>burner                     | ←                                | Yes                   | 40         |            |
|               | Dunkirk.....       | \$1.00                                   | \$ 45                                  | —  | Non-<br>Union                             | \$7.50                       | →                  | →                  | Yes            | Yes                  | ←  | Yes                            | Sketch   | No  | —                                      | No  | —  | —   | —  | —   | —                     | —                    | ?                       | ?  | —                                       | —                                 | —                                  | —                                | Yes                   | 20         |            |
|               | Geneva.....        | \$1.00                                   | \$ 40                                  | 1/2  | Union                                     | \$15-<br>\$20                | Yes                | No                 | No             | Yes                  | ←  | Yes                            | Yes  | No  | 33 1/3                                 | No  | 30   | No  | b;<br>\$1.50<br>d  | 30  | \$8-<br>\$15<br>2d    | \$15-<br>\$18<br>2d  | 2d                      | 2d   | No                                      | No                                | \$10                               | \$30                             | Yes                   | ←          |            |
|               | Rochester.....     | \$ 80-<br>\$1                            | \$ 40                                  | —  | Non-<br>Union                             | \$14-<br>\$16                | Yes                | No                 | No             | Yes                  | ←  | No                             | Yes  | No  | 25                                     | No  | With<br>Unit<br>25 &<br>10                     | No  | a; own<br>men  | 25 &<br>10  | ?                     | \$30                 | —                       | —  | No                                      | No                                | Varies                             | Varies                           | Yes                   | ←          |            |
|               | Watertown....      | \$1.00                                   | \$ 50                                  | 1  | Union                                     | \$25-<br>\$35                | →                  | →                  | Yes            | Yes                  | ←  | Yes                            | No   | No  | 25 &<br>10                             | No  | 25 &<br>10                                     | No  | a; own<br>men  | 25 &<br>10  | ?                     | \$30                 | —                       | —  | No                                      | No                                | \$35                               | \$55                             | Yes                   | 25 &<br>10 |            |

# Price per Opening Resume

| Furnaces Include— |         | Inside Tank Charge for Setting Outside Tank | Are Registers Included in P/O | % Added for Profit to Net Cost of Registers | Are Openings Made By |                          |  |           | P/O Applies to These Systems                |  |                             | Branch Pipe Takeoffs are |                   | Does P/O Include                                |                    |                                     |                                |                    | Does P/O Apply to Returns as Well as Supplies | Return P/O Is | P/O Applies To                  |                                     |                                | Is P/O Based On  |   | Does P/O Include Smoke Pipe and Erection | P/O Where Contractor Does NOT Sell Any Equipment | Where P/O Applies To Metal Work Only     |  |                               |
|-------------------|---------|---|-------------------------------|---|----------------------|--------------------------|--|-----------|---|--|-----------------------------|--------------------------|-------------------|---|--------------------|-------------------------------------|--------------------------------|--------------------|---|---------------|---------------------------------|-------------------------------------|--------------------------------|--|---|--|--|--|--|-------------------------------|
|                   |         |   |                               |   | Carpenters           | Charge for Each Hole Cut | % Added for Profit to Carpenter's Charge | Own Men   | Rectangular Mains with Rectangular Branches | Rectangular Mains with Round Pipe branches | Complete Round Pipe Systems | Air Flow Fittings        | Side Tap Takeoffs | Does P/O Include BOTH Supply and Return Plenums | Painting All Pipes | Full Asbestos Covering on All Pipes | Three-ply Air-cell, Full Cover | Taping Joints Only |   |               | Unlined but Panned Joint Spaces | Paper Lined and Panned Joint Spaces | Complete All-Metal Return Duct | Standard 14" Sizes of Pipe, Not Necessarily Pre-fabricated | Each Pipe Sized to Exact Room Requirement |  |  | Does P/O Include Smoke Pipe and Erection | P/O Where Contractor Does NOT Sell Any Equipment | Charge for Setting Furnace Is |
| Yes               | —       | —   | No                            | Yes   | No                   | —                        | No                                       | —         | Yes   | —  | Yes                         | No                       | No                | No  | Yes                | No                                  | —                              | —                  | —   | Yes           | —                               | Yes                                 | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | 40      | —   | No                            | G.C.  | ←                    | —                        | No                                       | Yes       | No  | No   | Yes                         | Yes                      | Yes               | No  | No                 | No                                  | Yes                            | ←                  | —   | —             | No                              | No                                  | \$19                           | \$20   | —   | —  | —  | —  | —  |                               |
| No                | 30      | \$133                                       | No                            | Yes   | \$2                  | 40                       | No                                       | Yes       | Yes   | No   | Yes                         | ←                        | Yes               | No  | No                 | No                                  | Yes                            | ←                  | Yes   | —             | Yes                             | Yes                                 | \$10                           | \$40   | \$30                                      | None                                     | —  | —  | —  | —                             |
| Yes               | 20      | \$12  | No                            | Yes   | \$2                  | 20                       | No                                       | Yes       | ←   | ←  | Yes                         | ←                        | Yes               | No  | No                 | —                                   | —                              | →                  | →   | Yes           | No                              | Yes                                 | Won't Quote                    | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | 50      | —   | No                            | Yes   | —                    | —                        | No                                       | Yes       | ←   | ←  | Yes                         | ←                        | No                | Yes   | ←                  | ←                                   | Yes                            | ←                  | Yes   | —             | Yes                             | —                                   | \$30                           | \$10   | \$15                                      | None                                     | —  | —  | —  | —                             |
| Yes               | ←       | —   | No                            | Yes   | —                    | —                        | No                                       | →         | Yes   | ←  | →                           | Yes                      | Yes               | No  | No                 | No                                  | Yes                            | No                 | \$16—first<br>\$28—second                     | →             | Yes                             | Same                                | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | 10      | \$73  | Yes                           | Yes   | \$4                  | 10                       | No                                       | Yes       | No  | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | Yes                            | Yes                | ←   | —             | —                               | Yes                                 | \$30                           | \$25   | \$25                                      | —  | —  | —  | —  | —                             |
| No                | 30      | —   | Yes                           | Yes, on some jobs                           | \$1.50 per hr.       | 10                       | Sometimes                                | Yes       | No  | No   | Yes                         | Yes                      | No                | No  | No                 | No                                  | No                             | Yes                | ←   | —             | —                               | No                                  | \$28                           | \$20   | \$12—\$15                                 | —  | —  | —  | —  | —                             |
| Yes               | 12      | —   | No                            | Yes   | \$2—\$2.50           | 12                       | On old houses                            | Yes       | No  | No   | No                          | Yes                      | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | →             | →                               | Varies                              | \$25                           | \$15—\$25  | —   | —  | —  | —  | —  | —                             |
| Yes               | List-40 | \$20—\$115                                  | Yes                           | No  | —                    | 20-40                    | Yes                                      | \$20—\$25 | \$15—\$20                                   | \$10—\$15                                  | Yes                         | ←                        | Yes               | No & Yes  | No                 | No                                  | No                             | Yes                | ←   | →             | →                               | Varies                              | \$10—\$20                      | \$20 up  | \$15                                      | o  | —  | —  | —  | —                             |
| Yes               | 33 1/2  | ?   | Yes                           | No  | —                    | 33 1/2                   | Yes                                      | Yes       | No  | No   | Yes                         | ←                        | Yes               | No  | No                 | No                                  | Yes                            | Yes                | ←   | —             | —                               | \$12 to \$15                        | \$20                           | See Col. 23  | None                                      | —  | —  | —  | —  | —                             |
| Yes               | 25      | ?   | No                            | Yes   | By Owner             | ←                        | No                                       | Yes       | No  | No   | Yes                         | ←                        | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | —             | —                               | ?                                   | ?                              | ?  | ?   | —  | —  | —  | —  | —                             |
| Yes               | 40-50   | —   | Yes                           | No  | ←                    | 40-50                    | Yes                                      | Yes       | Yes   | Yes  | Yes                         | Yes                      | No                | Yes, 12 lb.                                     | No                 | No                                  | Yes                            | ←                  | Yes   | No            | Yes                             | —                                   | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | ←       | ?   | No                            | Yes   | By Owner             | ?                        | No                                       | Yes       | No  | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | Yes                            | ←                  | —   | —             | No                              | \$22                                | ?                              | ?  | ?   | —  | —  | —  | —  | —                             |
| Yes               | 25-40   | \$40 <sup>1</sup>                           | Yes                           | No  | ←                    | ?                        | Yes                                      | Yes       | No  | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | Yes           | No                              | \$16                                | —                              | —  | \$13.50                                   | —  | —  | —  | —  | —                             |
| Yes               | 0-20    | —   | No                            | Yes   | Contract             | 0                        | No                                       | Yes       | No  | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | —             | —                               | \$14                                | \$20—\$25                      | \$16—\$20  | None <sup>6</sup>                         | —  | —  | —  | —  | —                             |
| Yes               | 50      | —   | Yes                           | Usually                                     | \$1—\$1.25           | 0                        | No                                       | Yes       | No  | No   | No                          | Yes                      | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | —             | —                               | \$18                                | \$30                           | \$12   | \$5                                       | —  | —  | —  | —  | —                             |
| Yes               | 30      | \$25  | No                            | Yes   | Owner                | ?                        | No                                       | Yes       | No  | No   | Yes                         | No                       | Yes               | Yes   | No                 | No                                  | No                             | Yes                | ←   | No            | No                              | Same                                | \$20—\$30                      | \$12—\$18  | None                                      | —  | —  | —  | —  | —                             |
| Yes               | 0       | —   | No                            | Yes   | \$1                  | 0                        | No                                       | Yes       | Yes   | No <sup>16</sup>                           | Yes                         | Yes                      | Yes               | No  | No                 | No                                  | No                             | Yes                | ←   | Yes           | No                              | \$15 Same                           | \$15—\$20                      | \$15   | ?   | —  | —  | —  | —  | —                             |
| Yes               | 40      | —   | No                            | Yes   | G.C.                 | —                        | No                                       | No        | Yes   | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | Yes                            | ←                  | \$17.50                                       | —             | \$22                            | Don't Do                            | \$23                           | \$15   | \$15                                      | —  | —  | —  | —  | —                             |
| Yes               | List    | —   | Yes                           | Sometimes                                   | \$1                  | 10                       | Sometimes                                | No        | Yes   | Yes  | —                           | —                        | Yes               | No  | Yes, 12 lb.        | No                                  | No                             | No                 | \$25—\$35                                     | No            | No                              | Same                                | \$20                           | \$10   | —   | —  | —  | —  | —  | —                             |
| No                | 20      | —   | Yes                           | Yes   | —                    | —                        | No                                       | Yes       | No  | Yes  | No                          | Yes <sup>10</sup>        | No                | No  | No                 | Yes                                 | See Note 10                    | See Note 10        | Yes   | No            | No                              | Same                                | \$40 complete                  | ←  | ←   | —  | —  | —  | —  | —                             |
| Yes               | 40      | ←   | Yes                           | Yes   | —                    | —                        | Yes                                      | Yes       | No  | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | No                             | \$18               | Yes   | No            | No                              | Don't Do                            | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | 20      | —   | Yes                           | No  | →                    | →                        | Yes                                      | Yes       | Yes   | No   | Yes                         | No                       | Yes               | No  | No                 | No                                  | Yes                            | ←                  | —   | —             | —                               | Yes                                 | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | ←       | Varies                                      | Yes                           | No  | →                    | →                        | Yes                                      | No        | Yes   | No   | Yes                         | —                        | Yes               | No  | No                 | No                                  | Yes                            | ←                  | No  | No            | Yes                             | —                                   | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | ←       | \$85  | No                            | Yes   | G.C.                 | 0                        | No                                       | Yes       | Yes   | Yes  | Yes                         | Yes                      | Yes               | Yes   | No                 | No                                  | Yes                            | ←                  | Yes   | No            | No                              | Don't Do                            | —                              | —  | —   | —  | —  | —  | —  | —                             |
| Yes               | 25 & 10 | —   | Yes                           | No  | —                    | 25 & 10                  | Yes                                      | Yes       | No  | No   | Yes                         | No                       | Yes               | Yes   | No                 | No                                  | No                             | \$35               | No  | No            | Yes                             | Don't Do                            | —                              | —  | —   | —  | —  | —  | —  | \$25                          |

where the material is carefully figured on a poundage basis the same chances of guessing wrong on labor prevail and a condition which runs up labor cost can easily appear in any job, no matter how figured.

The tabulation accompanying this article brings out pointedly some of the misunderstood features of price per opening. For example, if we take any group of cities in which the wage scale is about the same and the cities are about the same size, the prices per opening quoted do not differ materially. As a matter of fact, prices per opening are not much different if we omit special examples where there obviously are especial reasons for a wide difference.

Now we must grant that these contractors in widely separated areas did not get together—instead, they must have found that month in and month out, taking all jobs as they come, prices ran

about alike. And, further, that certain conditions prevailed which set a price per opening on work and that to get jobs the contractor either had to meet this price or be able to sell his superior and higher priced service and installation.

The greatest evil in this whole picture is LOW PRICE. Town after town reported that prices per opening are working downward under the drive of competition, need for work, hard bargaining of buyers or builders, inexperienced or chiselling contractors but *this goes on no matter how the legitimate contractor figures*. Price per opening is *not the reason* for low prices—it may *contribute* to low prices by preventing the sloppy estimator from ever actually figuring his costs, but price per opening does not *make* low prices. To remedy low prices there must come into the picture some influence which sets *minimums* on design.

But even here, the tabulation shows that, generally

| State        | City               | Mechanics Wage Scale,<br>Per Day or Hour | Helpers Wage Scale,<br>Per Day or Hour                        | Number Helpers Per-<br>mitted to Each Mechanic | Shops Reporting are<br>Union or Non-Union | Price Per<br>Opening (P/O)    | Does P/O<br>Cover |                   |                | Does P/O<br>Apply to | Does P/O<br>Include                 |                                | Is Cost of Furnace and<br>Blower Included in P/O | % Added for Profit to Net<br>Cost of Furnace and Blower | Is Cost of Controls<br>Included in P/O | % Added for Profit to<br>Net Cost of Controls | Is Installation of<br>Controls Included in P/O | How Do Electricians Charge for<br>Installation of Controls (Note 2) | % Added for Profit to Elec-<br>tricians Charge for Wiring | Electrician's Charge for<br>Electrical Wiring on a<br>Forced Air System<br>Using a— |                   |                      |                         | On Oil-Fired Furnaces<br>Does P/O Include— |   |                                   |   | Are Registers<br>Included in P/O | % Added for Profit to<br>Net Cost of Registers |    |
|--------------|--------------------|--|---|--|---|-------------------------------|-------------------|-------------------|----------------|----------------------|-------------------------------------|--------------------------------|--|---|--|---|--|---|---|---|-------------------|----------------------|-------------------------|--|---|-----------------------------------|---|----------------------------------|--|----|
|              |                    |  |   |  |   |                               | New<br>House Work | Old<br>House Work | Either<br>Type |                      | Measuring up<br>the House           | Making a Plan<br>to Give Buyer |  |   |  |   |  |   |   | Gas-Fired<br>Unit   | Oil-Fired<br>Unit | Stoker-Fired<br>Unit | Hand-Fired<br>Coal Unit | Cost and Setting<br>an Inside Oil Tank     | Cost and Setting<br>an Outside Oil Tank | Charge for Setting<br>Inside Tank | Charge for Setting<br>Outside Tank                    |                                  |  |    |
| North Dakota | Fargo.....         | \$ .80                                   | \$ .50  | Open   | Non-Union                                 | \$17                          | Yes               | No                | No             | No                   | \$17—<br>first<br>\$20—<br>second   | No                             | No   | No  | 25                                     | No  | 25   | No  | b;<br>\$1.25  | 25  | No<br>Gas         | \$12 <sup>1</sup>    | \$12                    | \$3  | No                                      | No                                | \$55 <sup>17</sup>                                    | —                                | Yes  | 25 |
| Ohio         | Cincinnati.....    | \$1.375                                  | \$ .75  | ?  | Union                                     | \$28                          | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | Yes  | No  | 10                                     | No  | 10   | a; \$15<br>a; \$15—<br>Some<br>Cases<br>Yes                         | 10%   | \$15  | —                 | \$15                 | \$15                    | \$15                                       | 7 <sup>12</sup>                         | ?                                 | ?   | ?                                | Yes  | 10 |
|              | Cleveland.....     | \$1.375                                  | First 6<br>mos.<br>25% In-<br>creases<br>5%<br>each 6<br>mos. | 1/4  | Union                                     | \$14—<br>\$27<br>(Note<br>11) | Yes               | No                | No             | Yes                  | ←                                   | No                             | Some-<br>times                                   | No  | 10                                     | No  | 10   | Old<br>work<br>c  | 10—<br>average  | \$15—<br>\$25   | \$25—<br>\$150    | \$20—<br>\$80        | \$15—<br>\$25           | No, ex-<br>cept<br>spec'l<br>cases         | No, ex-<br>cept<br>spec'l<br>cases      | \$10—<br>\$70                     | \$30—<br>\$110  | Yes                              | 0-10   |    |
|              | Toledo.....        | \$1.25                                   | \$ .50—<br>\$ .65   | 1  | Union                                     | \$12—<br>\$20                 | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | Yes  | No  | 30+<br>Tax                             | No  | 30+<br>Tax                                     | a & b   | 30+<br>Tax  | Note<br>13  | Note<br>13        | Note<br>13           | Note<br>13              | No   | No                                      | —                                 | —   | Yes                              | 30+<br>Tax                                     |    |
|              | Van Wert.....      | \$ .70                                   | \$ .40  | —  | Non-<br>Union                             | \$16                          | →                 | →                 | Yes            | Yes                  | ←                                   | Yes                            | Yes  | No  | 30                                     | No  | 30   | d   | 30  | Note<br>2d  | Note<br>2d        | Note<br>2d           | Note<br>2d              | No   | No                                      | \$35                              | —   | No                               | 30   |    |
|              | Warren.....        | \$1.15                                   | \$ .50  | 1  | Union                                     | \$15                          | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | No   | No  | 30                                     | No  | 30   | b;<br>\$2.50  | 10  | \$15—<br>\$20   | \$15—<br>\$20     | \$10—<br>\$15        | \$10                    | No   | No                                      | \$50                              | \$60  | Yes                              | 30   |    |
| Oregon       | Salem.....         | \$ .75                                   | \$ .35  | 1/2  | Non-<br>Union                             | \$10—<br>\$14                 | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | Yes  | No  | 25                                     | No  | 25   | a;<br>\$5.75  | —   | \$5.75  | \$20              | —                    | \$3.50                  | No   | No                                      | \$10                              | \$30  | Yes                              | 25   |    |
| Pennsylvania | Lewistown.....     | \$ .70                                   | \$ .45  | —  | Non-<br>Union                             | \$25                          | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | No   | No  | 20                                     | No  | 20   | b; \$.80  | 20  | —   | —                 | —                    | —                       | —  | —                                       | —                                 | —   | Yes                              | List   |    |
|              | Pittsburgh.....    | \$1.50                                   | \$ .50—<br>\$ .75   | Open   | —   | \$20—<br>\$25                 | Yes               | No                | No             | Yes                  | ←                                   | No                             | No   | No  | 0 <sup>14</sup>                        | No  | 0 <sup>14</sup>                                | —   | 0 <sup>14</sup>   | \$10  | ?                 | ?                    | ?                       | ?  | ?                                       | ?                                 | ?   | Yes                              | 0 <sup>14</sup>                                |    |
| Texas        | Wichita Falls..... | \$ .75—<br>\$1                           | \$ .35—<br>\$ .50   | Open   | Non-<br>Union                             | \$17.50                       | Yes               | No                | No             | No                   | \$17.50<br>first<br>\$20—<br>second | Yes                            | No   | No  | 20                                     | No  | 20   | b;<br>\$1.50  | 10  | \$12.50   | \$15              | ?                    | ?                       | No   | No                                      | \$65                              | \$75<br>in-<br>cludes<br>con-<br>nection<br>to burner | No                               | 10   |    |
| Wisconsin    | La Crosse.....     | \$1.00                                   | \$ .65  | 1/2  | Union                                     | \$20                          | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | Yes  | No  | 0                                      | Yes   | 0  | —   | 0   | —   | —                 | —                    | —                       | No   | No                                      | \$15                              | \$50  | Yes                              | 0  |    |
|              | Madison.....       | \$ .85                                   | \$ .50  | Open   | Non-<br>Union                             | \$14                          | Yes               | No                | No             | No                   | \$14—<br>first<br>\$17—<br>second   | Yes                            | Yes  | No  | 10                                     | Yes   | 0  | b;<br>\$1.50  | —   | \$7.50<br>—\$30   | Same              | Same                 | Same                    | No   | No                                      | \$20                              | Varies  | Yes                              | 10   |    |
|              | Oshkosh.....       | \$ .85                                   | \$ .60  | —  | Union                                     | \$14                          | Yes               | No                | No             | Yes                  | ←                                   | Yes                            | No   | No  | 30                                     | No  | 30   | b;<br>\$1.50  | 30  | \$30  | \$30              | \$30                 | \$15                    | No   | No                                      | —                                 | —   | No                               | 30   |    |

1. The mark (—) indicates no report on particular question.

2. a=flat price per opening; b=price per hour of labor; c=time and material; d=contractor does own wiring.

3. Includes cost of tank at \$17.50.

4. Frequently included in contract of oil burner installer.

5. Covers only four common sizes of branch takeoffs.

6. Oil burner and stoker agencies quoting \$12 for a one-year service plan.

7. Answers based on \$15 to \$16 per opening. Many jobs being bid at \$8 to \$12.

8. Jobs under 12 openings, no plan; over 12 openings, complete plan and layout.

9. Complete schedule is: (New, single register—\$11 first; \$14 second; \$17 third.) New, double register, same size—\$12.50 first; \$15.50 second; \$19 third.) (New, double register, diff. sizes—\$14 first; \$17 second; \$20.50 third.) (Old, single register—\$14 first; \$21 second; \$27 third.) (Old, double register, same size—\$16 first; \$23 second; \$29 third.) (Old, double register, diff. size—\$17.50 first; \$24.50 second; \$29 third.)



speaking, contractors are including about the same things in their bids. Glancing down any of the columns of what is offered, shows that the "yesses" and the "nos" are surprisingly consistent, even for widely differing cities. And when cities are grouped for similarity, the consistency is even more pronounced.

In explanation of the table, a preliminary questionnaire was mailed to several hundred contractors asking for prices per opening, mechanic and helper wage scales in their city. Immediately it became apparent that these prices per opening were meaningless without a complete breakdown of *what was offered* for any given price per opening. So a second questionnaire was prepared asking all of the questions shown in the heading of the table. It should be evident to any reader that the detail of the questionnaire automatically eliminated scores of readers who answered the first questionnaire.

Nevertheless, replies were received in sufficient numbers to tabulate conditions for forty cities and towns. Most of the towns reported were covered by at least two readers. In some towns six or more replies were grouped. And the replies were surprisingly consistent, too.

So far as possible, only reputable contractors were solicited; also, only contractors with shops. Naturally, the reports reflect primarily the reporters' *own shop operations*, but in several cases an entire local association pooled their answers. There are many blanks or question marks. These indicate that the reporters did not have the answers or could not find them by telephone. To all those who gave time to help prepare this report we take this opportunity to express our thanks.

Endless comparisons can be made, but one thing

(Continued on page 140)

| Charge for Setting Outside Tank                     | Are Registers Included in P/O | % Added for Profit to Net Cost of Registers | Is Cost of Cutting Openings Included in P/O | Are Openings Made By   |                          |  | P/O Applies to These Systems |   |  | Branch Pipe Takeoffs are            |                   | Does P/O Include  |   |                    |                                     |                                | Does P/O Apply to Returns as Well as Supplies | Return P/O Is | P/O Applies To     |                                 |                                     | Is P/O Based On                |   | Does P/O Include Smoke Pipe and Erection | P/O Where Contractor Does NOT Sell Any Equipment | Where P/O Applies To Metal Work Only      |                               |   |  |
|---|-------------------------------|---|---|------------------------|--------------------------|--|------------------------------|---|--|-------------------------------------|-------------------|-------------------|---|--------------------|-------------------------------------|--------------------------------|---|---------------|--------------------|---------------------------------|-------------------------------------|--------------------------------|---|--|--|---|-------------------------------|---|--|
|   |                               |   |   | Carpenters             | Charge for Each Hole Cut | % Added for Profit to Carpenter's Charge | Own Men                      | Rectangular Mains with Rectangular Branches | Rectangular Mains with Round Pipe branches | Complete Round Pipe Systems         | Air Flow Fittings | Side Tap Takeoffs | Does P/O Include BOTH Supply and Return Plenums | Painting All Pipes | Mull Abbestos Covering on All Pipes | Three-ply Air-cell, Full Cover |   |               | Taping Joints Only | Unlined but Panned Joist Spaces | Paper Lined and Panned Joist Spaces | Complete All-Metal Return Duct | Standardized Sizes of Pipe, Not Necessarily Prefabricated |  |  | Each Pipe Sized to Exact Room Requirement | Charge for Setting Furnace Is | Charge for Installing Control Equipment | Charge for First or One Year's Service |
| —   | Yes                           | 25  | Yes   | No                     | —                        | 25                                       | Yes                          | No  | Yes  | Yes                                 | No                | Yes               | No  | No                 | No                                  | Yes                            | Yes   | ←             | —                  | —                               | —                                   | No                             | Yes   | Yes                                      | \$17 including registers                         | \$15                                      | \$1.50, no wiring             | \$5                                     |  |
| ?<br>\$30-<br>\$110                                 | Yes                           | 10<br>0-10                                  | No  | Yes                    | ?<br>Owner<br>or<br>G.C. | —  | No                           | No  | Yes  | No                                  | Yes               | Yes               | No  | No                 | No                                  | Yes                            | Yes   | ←             | No                 | No                              | Yes                                 | No                             | Yes   | Yes                                      | ?<br>\$18-<br>\$20 or<br>plus<br>10%             | \$10-<br>\$40                             | \$15-<br>\$25                 | —                                       |  |
| —   | Yes                           | 30+<br>Tax                                  | No  | Yes, on<br>new<br>work | G.C.                     | —  | Yes, on<br>old<br>work       | Yes   | No   | No                                  | Yes               | Yes               | No  | No                 | No                                  | No                             | Yes   | ←             | Yes                | No                              | No                                  | No                             | Yes   | No                                       | Don't<br>Do                                      | —   | —                             | —                                       |  |
| —   | No                            | 30  | No  | No                     | G.C.                     | —  | No                           | Yes   | Yes  | Yes                                 | Yes               | Yes               | No  | No                 | No                                  | Yes                            | Yes   | ←             | Yes                | No                              | No                                  | No                             | Yes   | Yes                                      | Don't<br>Do                                      | —   | —                             | —                                       |  |
| \$60  | Yes                           | 30  | No  | Yes                    | G.C.                     | —  | No                           | No  | Yes  | No                                  | Yes               | No                | No  | No                 | No                                  | Yes                            | Yes   | ←             | Yes                | No                              | No                                  | No                             | Yes   | No                                       | Don't<br>Do                                      | \$30                                      | Don't<br>Do                   | —                                       |  |
| \$30  | Yes                           | 25  | Yes   | No                     | —                        | —  | Yes                          | No  | Yes  | No                                  | No                | Yes               | Yes   | No                 | No                                  | No                             | Yes   | Yes           | ←                  | —                               | —                                   | —                              | Yes   | No                                       | Yes,<br>Black<br>Iron                            | Don't<br>Do                               | —                             | —                                       | —                                      |
| —   | Yes                           | List  | No  | Yes                    | G.C.                     | —  | No                           | Yes   | No   | No                                  | Yes               | Yes               | Yes   | No                 | Yes                                 | No                             | Yes   | ←             | —                  | —                               | —                                   | No                             | Yes   | Yes                                      | \$30   | \$25                                      | —                             | —                                       |  |
| ?   | Yes                           | 0 <sup>14</sup>                             | No  | Yes                    | G.C.                     | —  | No                           | Yes   | Yes,<br>less \$2<br>a run                  | Yes,<br>less \$3<br>to \$5 a<br>run | Yes               | No                | Yes   | Yes                | No                                  | No                             | Yes   | ←             | Varies             | Varies                          | Varies                              | No                             | Yes   | Yes                                      | \$20-<br>\$25                                    | —   | —                             | —                                       |  |
| \$75<br>includes<br>con-<br>nection<br>to<br>burner | No                            | 10  | No  | Yes                    | —                        | —  | No                           | Yes   | Yes  | Yes                                 | Yes               | Yes               | No  | Yes,<br>12 lb      | No                                  | No                             | Yes   | ←             | —                  | —                               | —                                   | No                             | Yes   | Yes                                      | Same   | \$10                                      | \$5                           | \$10                                    |  |
| \$50<br>Varies                                      | Yes                           | 0   | Yes   | No                     | →                        | 0  | Yes                          | Yes   | No   | No                                  | Yes               | Yes               | Yes   | No                 | No                                  | No                             | No  | \$15          | No                 | No                              | Yes                                 | No                             | Yes   | No                                       | \$30   | \$25                                      | \$25                          | —                                       |  |
| —   | Yes                           | 10  | Yes   | Yes                    | \$2                      | 10                                       | Some-<br>times               | Yes   | No   | Yes                                 | Yes               | No                | Yes   | No                 | No                                  | Yes                            | Yes   | ←             | No                 | No                              | Yes                                 | No                             | No  | Yes                                      | \$16   | \$25                                      | \$12-<br>\$20                 | \$14-<br>\$16                           |  |
| —   | No                            | 30  | No  | Yes                    | G.C.                     | —  | No                           | Yes   | No   | No                                  | Yes               | No                | Yes   | No                 | No                                  | No                             | Yes   | ←             | No                 | No                              | Yes                                 | No                             | Yes   | Yes                                      | —  | —   | —                             | —                                       |  |

10. Complete schedule is: (New houses, any floor, single registers—\$14.50; double registers, same size—\$16; double registers, diff. size—\$17.50.) (Old houses, single registers—\$17 first; \$20 second; \$23 third. Double registers, same size—\$19.50 first; \$22.50 second; \$25 third; double registers, diff. size—\$22.50 first; \$29.50 second; \$25.50 third.)

11. Cleveland reports some non-union work at \$14 per opening, but on union jobs \$22 to \$27 is average. For less than 15 openings P/O about \$24; above 15 openings, \$27 per opening.

12. Definite figures unavailable; almost no oil jobs in Cincinnati.

13. Some contractors do own electrical work. Others hire work done at hourly rates.

14. In this report all profit is included in selling price of equipment.

15. In St. Louis baseboard registers are priced at \$12 or \$12.50; high side wall registers at \$13 for first floor. Baseboard at \$14.50; high side wall at \$15 for second floor.

16. Some contractors use all round pipe and quote about \$3 less per opening.

17. \$55 includes tank, piping and labor.

*The Label* is your **GUARANTEE**

It's easy to find and is YOUR insurance of satisfaction

Inset on seeing it on the castings to be used when your furnace is being repaired.

Improperly fitting castings, even if they look new, may be "bootleg" inferior quality and not properly made. Look for the manufacturer's label and you'll KNOW you're safe.

League members use only parts specified by original manufacturer on Moncrief, Niagara or Sunbeam repairs.

**Call MAIN 6377 NOW**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE**

THE Warm Air Furnace and Air Conditioning League of Cleveland, Ohio this past fall conducted a newspaper campaign to stimulate furnace repair and cleaning. One newspaper was used—the Press—and the space bought was placed on the building page which appears once each week.

The campaign consisted of ten advertisements, all different, with copy and layout prepared by the advertising committee of the league and the advertising department of the newspaper.

Three principal themes were used. Number one stressed manufacturers' label which is placed on genuine factory parts. The owner was reminded to examine all parts bought to see that this label appeared on each

## The 10-Weeks Newspaper Advertising Campaign of Cleveland's "League"

part. To support the recommendation, the advertisements emphasized that only genuine, factory parts offered any assurance that old and new parts would fit and that the material used was of superior quality.

Theme number two stressed original factory parts and pointed out the danger of inferior quality and improper fit of parts made from broken castings and the possibility of gasing due to inability to cement joints tightly.

Theme number three advertised a cleaning and recementing service beginning at \$12.00 and pointed out the satisfaction of putting the furnace in proper condition at the beginning of the heating season.

In each advertisement the owner was invited to call Main 6377 for further information or to ask for a member of the League to call, and give an honest inspection. Each advertisement emphasized that all League members used only original manufacturer's parts and was prepared to give the cleaning and recementing service advertised.

Main 6377, the phone number advertised, is the Phy-

**GENUINE FURNACE PARTS**  
ASSURE SATISFACTION

The label is your guarantee!  
Look for it!

Furnace Cleaned and Re-Cemented... **\$12 UP**

We use only manufacturer's specified parts when repairing NIAGARA and MONCRIEF FURNACES.

**Call MAIN 6377**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE, INC.**

**MAKE SURE THEY'RE**  
**Original Parts**

**SUBSTITUTE PARTS ARE DANGEROUS!**

THE *Label* IS YOUR GUARANTEE

Perfect fitting—manufacturer's specified parts insure gas, smoke and dirt-free homes. We use only genuine parts on repairs to  
**NIAGARA AND MONCRIEF FURNACES.**  
When you need your furnace repaired.

**CALL MA. 6377**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE, INC.**

**GET YOUR FURNACE REPAIRED NOW!**

**The LABEL IS YOUR GUARANTEE**



of genuine, original manufacturer's parts. It insures a gas, soot and smoke-free home. Warrantage of inferior grade parts will, in most cases, break the sealed joint between castings and permit gas, soot, etc., to enter your rooms. League members use only manufacturer's specified parts on Moncrief, Niagara and Sunbeam furnace repairs.

Your furnace should be inspected—cleaned and, if necessary, repaired NOW—while you can suffer no inconvenience due to an inactive heating plant, as you will in colder weather. If you want a continuous, honest inspection—

**JUST CALL MA. 6377**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE**

**We will Rebuild, Re-cement and clean Your Furnace**

**AS LOW AS \$12**



**Call MAIN 6377**

**The LABEL is your Guarantee**

Eliminate smoke, gas fumes and dirt by having the joints between the furnace castings re-cemented. A thorough cleaning of the furnace is included.

of genuine manufacturer's specified parts when your furnace needs repair—insist on it—for YOUR protection.

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE**

**DON'T LET WINTER CATCH YOU WITH A FAULTY FURNACE**

**Have it Checked Now!**

Avoid cold weather inconvenience and discomfort—our expert furnace men can put your heating system in first class condition—economically.

**Insist on the "Genuine Parts" Label**

We use only manufacturers specified parts when repairing Moncrief, Niagara and Sunbeam furnaces.



**Call MAIN 6377 Now**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE**

**INSIST ON Original Parts FOR YOUR PROTECTION**

**The Label is Your Guarantee**



Look for it on every casting. Manufacturer specified parts are made for YOUR furnace. Substitute parts are not the best safeguard against gas, soot, smoke, etc., in your house.

**We Use Genuine MONCRIEF AND NIAGARA Repair Parts When Repairing These Makes**

**JUST CALL MA. 6377**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE, INC.**

**Original Repair Parts INSURE SATISFACTORY FURNACE REPAIRS**

**THE Label IS YOUR GUARANTEE**



of accurately fitting castings—which assure a gas and smoke-free home—while increasing heating efficiency. Inferior parts cause early trouble due to warping or cracking. You save money when you insist on genuine manufacturer's specified parts on Sunbeam, Niagara and Moncrief furnace repairs.

**Call MAIN 6377 NOW**

**WARM AIR FURNACE AND AIR-CONDITIONING LEAGUE, Inc.**

**SAFEGUARD YOUR HOME**

ELIMINATE GAS, SMOKE AND DIRT

**FURNACE CLEANED AND RE-CEMENTED \$12 UP**

**WE USE ONLY GENUINE MONCRIEF & NIAGARA PARTS IN OUR REPAIRS**

**The Label Is Your Guarantee**

**Just Call MAIN 6377**

**WARM AIR FURNACE & AIR CONDITIONING LEAGUE, INC.**

On these two pages are shown the complete set of ten advertisements. Most insertions appeared on Saturday on the "Press" building page. The "up-and-down" ads measured 4 inches wide and 5 inches high; the others were a shy 4 inches wide and 3½ inches high. Anyone wishing to know the sequence in which the ads appeared should write the editors.

**OUR MEN USE ORIGINAL PARTS**

**THE Label IS YOUR GUARANTEE**



In all repairs to **NIAGARA AND MONCRIEF** furnaces, assuring utmost satisfaction.

**Furnace Cleaned and Re-Cemented \$12 UP**

**Call MAIN 6377**

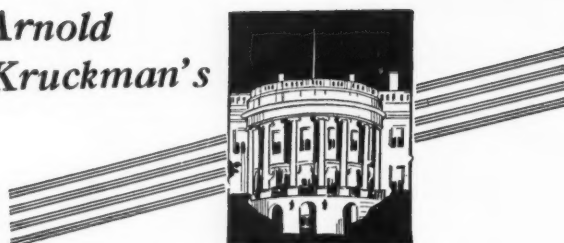
**WARM AIR FURNACE & AIR CONDITIONING LEAGUE, INC.**

sicians and Surgeons Call Bureau, a central switch-board from which calls can be relayed through the city. The arrangement with the bureau was that all calls received were sent to contractors direct according to alphabetical order and in rotation through the list of members of the League. These calls, also, were sent only to contractors with paid up dues and if any member let his dues lapse during the campaign his name was removed from the list.

The name, address and phone number of each owner calling was noted and a followup call was made after two days. If the contractor given the call had not contacted the owner within the two days the inquiry was passed along to the next contractor in order.

The campaign was paid for by the League and co-operating manufacturers. No special dues were levied for the campaign, the money being allotted from treasury funds.





## Washington Letter

### Small Business Loans; The Defense Program

**G**OVERNMENT credit will be available for small business organizations and individuals when a bill now before the Congress is enacted. The purpose of the proposed law is to enable the little fellow to get the same service now offered to Big Business through the RFC, to the farmer through the Farm Credit Administration, and to the wage-earner through FHA. It is estimated there are over 2,000,000 small service, merchandising, and manufacturing units in the United States, and that they support at least one-third of the population. Heretofore they have been the one great major section of the nation for which the Government has done very little, directly.

#### Little Business Conference

As may be recalled, Little Business became suddenly, and rather startlingly, articulate when it gathered in conference in Washington on invitation of Secretary of Commerce Roper. The meeting turned out to be something between a rebellion and a three-ring circus. But out of it grew a deadly serious purpose on the part of Little Business to organize. Seventeen more or less national organizations sprang into existence. The majority have since become very effective regional organizations, and one or two have maintained a national status. The one most generally recognized in Washington—possibly the only one of which Washington is conscious—is the American Federation of Little Business, with headquarters in the Heurich Building. It is nationwide, unpartisan, strictly business for small business, and has a Board

of very earnest and vigorous young business men.

George Olmsted, formerly head of the Junior Chamber of Commerce of the United States, and also former head of the Young Republicans of the United States, a small business man in Des Moines, Iowa, is president. Tyre Taylor, a really patriotic lawyer, who resigned from the RFC, and who formerly was national head of the Young Democrats a South Carolinian, is the other major driving force. The Board itself represents all sections from the Pacific Northwest to the Atlantic and Gulf regions in the Southwest. Although it works actively in every State, Territory and Possession, the Federation has only three paid workers and they do a big job for very modest pay. The lusty young Federation is a striking contrast to the many overstuffed national civic and trade organizations that flourish in Washington, especially when the Congress is in session.

#### How Loans Will Be Made

When the small business credit bill is made law—and it should pass without any doubt—little business will be able to borrow money for a long time at low rates. Just what form the loans will take is not yet clear. The crystalization will probably occur in the Congressional committee hearings. Marriner Eccles of the SEC, and his following think the small loans should be made by banks, insurance companies, and other financial institutions guaranteed by the Government after the fashion of the FHA loans for wage-earners. Others believe a chain of intermediate credit banks should be created by the Govern-

ment and that these banks like the Federal Savings and Loan Associations which are part of the Farm Credit Administration, should combine private capital and management with government capital and regulation. The farm finance institutions are said to be genuinely successful. There is unanimity in the belief that loans should be made in sums from \$50 upwards and that loans should be principally made on competence and reputation. Both the Congress and the White House are in agreement that the legislation is desirable.

#### Reducing Taxes

The Federation also is making a drive to reduce taxes, and to induce the Government to devise a simpler system of taxation. It is estimated that all business and industry last year spent over \$500,000,000 to prepare and maintain the various reports and records which had to be furnished to the Government. Reliable estimates reveal that it costs each person 35% of his income to support Government today, while in 1914 it cost 5%. Government itself, the other day, stated that every person gainfully employed, is working two hours and 14 minutes daily to pay Government bills. Another estimate showed that there are 195 hidden taxes in the price of a farmer's fence. And that 19c out of each dollar we spend goes to the Government, not including income, corporation, inheritance, gift, social security, and other Federal taxes. The most surprising revelation was the statement that only one-sixth of the funds collected for taxes are spent for relief.

## Wage-Hours Interpretations

The Federation also is making an effort to secure more equitable administration for small business in the application of the Social Security Law, the National Labor Relations Law, and the Wage-Hours Law. It has just been told at the Wage-Hours Division that sheet metal workers, by and large, are assumed to be amenable to the law. The interpretation is based upon the idea that in working with sheet metal, and in making the various products produced, the sheet metal worker comes into the category of a *processor*; and as a processor he is not an ultimate consumer, but makes merchandise that passes into the stream of interstate commerce. On the other hand, the sheet metal worker who works upon details of equipment also probably comes into the category of interstate commerce. In this division of his transactions, either in person or through the agency of those who work for him, he may occasionally be exempt from the Law. It depends upon the purpose for which the building or structure or object upon which he subordinatedly is working, is ultimately intended.

For instance, if he works upon an air-conditioning system in a building intended to be used by its owner for interstate commerce, the sheet metal worker, like all other persons engaged in any subordinate details of the construction, becomes amenable to the Wage-Hours Law. In Interpretative Bulletin No. 6, the Wage-Hours Administrator says that in his opinion "employees of contractors who are employed in repairing or altering buildings used to produce goods for interstate commerce" will probably eventually be held to be engaged in interstate commerce. In the same Bulletin he declares that those "engaged in maintaining, repairing, or reconstructing railroads, ships, highways, bridges, pipe lines or other essential instrumentalities of interests or foreign commerce seem to be subject to the Act."

### Are We Immune?

The building and construction industry generally heretofore has held that, being neither a processor nor a merchandiser, under the Commerce Clause of the Constitution, the industry was immune from the Wage-Hours and similar interstate commerce laws. Recent mandatory regulations uttered by the Administrator require that employers must

keep an exact record of the hours worked by each employee each day and each workweek. If personnel works voluntarily, the employer still is liable. This regulation was chiefly issued to check some employers who were attempting to take legal refuge in notice to their help that no overtime work could be done without official authority in each instance. The intent apparently was to relieve the employer of responsibility for overtime if the employer issued no specific authority for the work. Under the recent regulation, however, the employer becomes liable even when he does not know that the employee has worked overtime.

### Wholesalers Who Sell Retail

Wholesale businesses that also do retail business must separate the transactions by doing one kind of business in one room, and the other in another. If the two types of transactions are intermingled, the Administrator is of the opinion that no exemption may be expected. The question that comes up most frequently among small business men is the desire to know exactly what constitutes a retail business that is exempt in the opinion of the Administrator. He states that an exempt retail business is a business that sells more than 50% of its services, or its goods, locally. A retail business exempt is determined by the number of sales made within a State, compared to the total of all business transacted by the firm. Also by the income derived from services or sales merchandised within the State, compared to the total gross income from all sources. It is expected that the exact status of such business may eventually be determined by making a survey of all business done within a three year period.

### "When" Is an Executive

Another frequent question is for a definition of an executive or administrative official or employee who, under the Law, is exempt. The Administrator has repeatedly given the opinion that any person bearing the title of manager, chief, superintendent, foreman, or boss, who does *any part* of the actual work done by those over whom he is set as supervisor, is NOT exempt. The test is whether or not the administrative or executive official actually does that which the workers do. For instance, a chief accountant, who does the daily work of keeping ac-

counts like his subordinates is not, under the Law exempt. The administrator or executive is presumed to confine his activities purely to supervision, direction, and management.

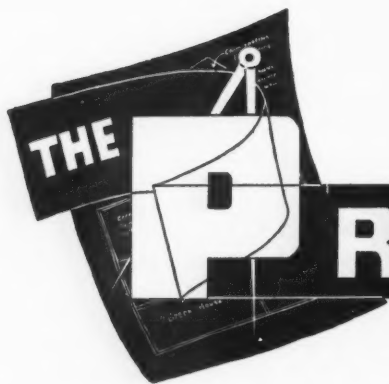
A working foreman or boss is not exempt. It has been ruled that any foreman who receives less than \$30 per week cannot be classified as an exempt administrative. The Wage-Hours Administrator has issued a great mass of interpretative opinions, and has issued a few mandatory regulations. He has also issued many abbreviated versions of answers to specific questions which he or his associates have sent many persons and firms, representing innumerable businesses and industries in almost every State in the country. These are available to any one who wishes copies. But the offices of the Administrator are so short of help, on account of insufficient appropriations, that many of these requests that come in by mail often are neglected. If any reader of *The AMERICAN ARTISAN* wishes copies he may write to the editor and the publications will be obtained and sent to the reader.

### Don't Invoke Penalties

Meanwhile, in considering these interpretations, it is wise to bear in mind that the Administrator himself declares the interpretations are purely opinions, and have no effect as Law. The actual final meaning of the Law will be determined by the U. S. Supreme Court. Its rulings may be completely in reverse. The Administrator warns, however, that the likelihood is his opinions will, in many instances, constitute the basis for the eventual legal ruling. Until such rulings are made, the employer is obliged to determine the meaning of the Law to his own satisfaction. The Administrator emphasizes that if the employer ignores the Law, or acts contrary to his interpretations, the chances are at least 2 to 1 that the employer will be obliged to pay a heavy penalty. And it should be remembered the penalty will be retroactive.

One of the few mandatory regulations issued by the Administrator affects apprentices and handicapped persons. The printed regulations are available. Any discussion about apprentices in all trades is of unusual interest at this time when the Defense program, and its corollary the Mobilization program, are so

(Continued on page 160)



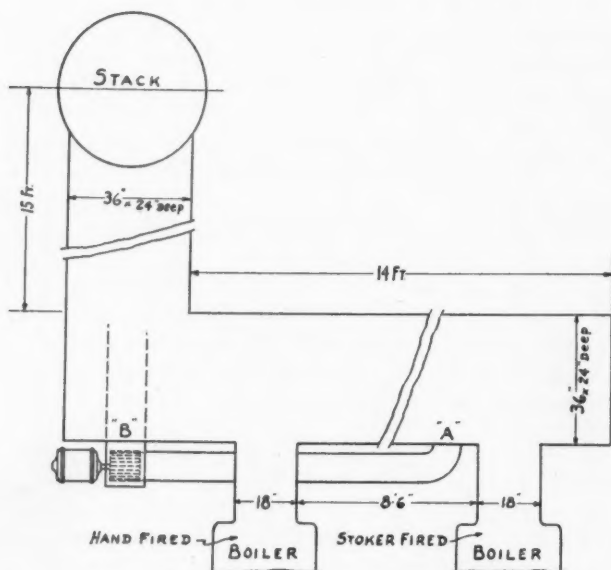
Your comment or experience is invited.

## PROBLEM CORNER

### Double Flue Connection

American Artisan:

Enclosed is a diagram of a flue for a pair of heating boilers. One boiler is stoker fired and the other is hand fired. The trouble is that smoke backs up when the forced draft



is turned on full force. Would you advise using a blower as shown at "B" and connect at "A" and let the pipe extend into the flue at "B"? The blower pipe should be damper controlled to regulate the air flow.

F. H. D., Penna.

Reply by  
S. Konzo,  
University of Illinois

I assume that when the forced draft is applied that the smoke backs up in the boiler which is hand fired. The arrangement which you suggest seems to be satisfactory, although under the conditions which you have I believe any solution can be determined only by a cut-and-try method. I believe an inducted draft fan in the stack itself would probably do the trick, but the method which you propose may be simpler. Some adjustment should be made on the fan so that the smoke from the hand fired boiler will not enter duct A. However, even if it does I do not see that it will be any serious trouble.

### Gas Appliance Draft

American Artisan:

In venting such gas appliances as water heaters, floor furnaces and warm air gas furnaces, what is considered proper draft? In those installations where the flue pipe runs horizontally where can a forced air draft blower be placed? Where can we buy one of these forced draft blowers?

J. E. H., Louisiana

Reply by  
The Editors.

Before answering we wanted to check with Mr. B. F. Johns of the Chicago Peoples Gas Light and Coke Company, House Heating Division.

Your question is rather difficult to answer precisely because there is no exact answer which can be given. First of all, every gas heating device which bears an A. G. A. approved rating must be so designed that the unit will vent itself without being connected to any chimney and without producing a carbon monoxide content above .04 of one percent. This means that for the average floor furnace or gas furnace, you really do not need a chimney excepting as the chimney is required to carry away the products of combustion such as CO<sub>2</sub>, water of condensation, and high temperature gas. Therefore, any chimney which has sufficient draft to suck a match flame into the chimney should be sufficiently strong.

The only method by which you can judge a chimney is Table 4 from page 198 of the 1938 edition of the A.S.H.& V.E. Guide. Just in case you do not have a copy of the Guide, we reproduce Table 4 herewith.

Table 14. Minimum Round Chimney Diameters for Gas Appliances (inches).

| Height of Chimney, Ft. | Gas Consumption in Thousands of Btu per Hour |      |      |      |      |      |       |       |       |
|------------------------|--|------|------|------|------|------|-------|-------|-------|
|                        | 100  | 200  | 300  | 400  | 500  | 600  | 700   | 800   | 900   |
| 20                     | 4.50   | 5.70 | 6.60 | 7.30 | 8.00 | 9.40 | 10.50 | 12.35 | 13.85 |
| 40                     | 4.25   | 5.50 | 6.40 | 7.10 | 7.80 | 9.15 | 10.25 | 12.10 | 13.55 |
| 60                     | 4.10   | 5.35 | 6.20 | 6.90 | 7.60 | 8.90 | 10.00 | 11.85 | 13.25 |
| 80                     | 4.00   | 5.20 | 6.00 | 6.70 | 7.35 | 8.65 | 9.75  | 11.50 | 12.85 |
| 100                    | 3.90   | 5.00 | 5.90 | 6.50 | 7.20 | 8.40 | 9.40  | 11.00 | 12.40 |

By selecting the height of your chimney and the thousands of Btu per hour input of the unit, Table 4 will tell you the round pipe diameter required.

Muncie Gear Works, Muncie, Indiana, manufactures a smoke pipe fan which is sold, we understand, through Sears, Roebuck & Company department stores.

American Foundry & Furnace Company, Bloomington, Illinois, Champion Blower & Forge Company, Lancaster, Pa., and Universal Blower Company, Birmingham, Michigan, are other manufacturers of this type of fan.

You will have to write to the manufacturers, excepting in the case of Sears, Roebuck, to find out where the unit can be bought.

We suggest that you consult the manufacturer of your heating unit for necessary draft.





VOTED



# RESIDENTIAL AIR CONDITIONING SECTION

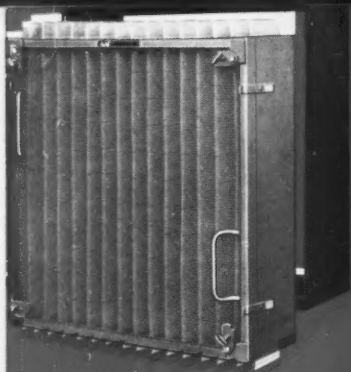
**D**URING 1938, we published a series of articles by G. A. Voorhees describing a precalculated method of engineering design. Up to now, the tables of heat loss calculations have appeared; in other words, the room requirements can be figured from tables published.

... The question then is, what can be done from here on to keep pipe sizing as simplified as the heat loss calculations? The answer appears in this section.

... Assuming certain register air temperatures and assuming that certain velocities are desirable through registers, stacks, branches and main trunk sections, and assuming certain general distances between registers and bonnet, it is possible to set up tables from which pipe sizes are read directly from the heat losses of each room. This article gives the first tables.

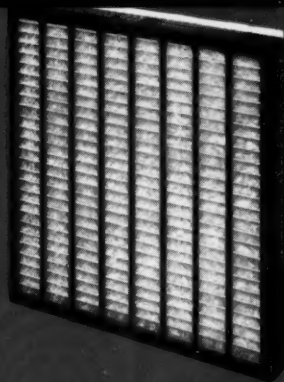
... With these data a job can be read off completely from tables. Such was the intent of the idea—we hope readers will find the idea applicable.





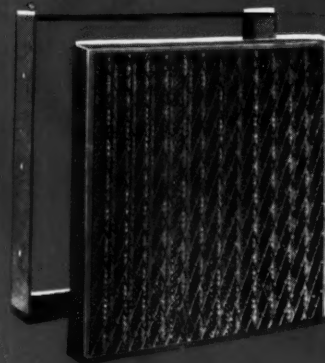
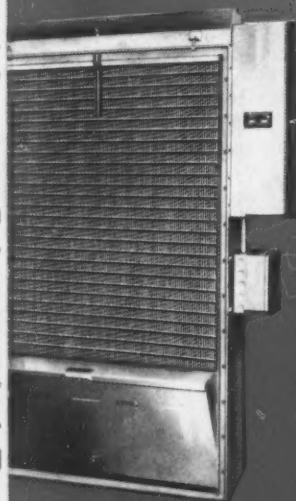
Airmat Type PL-24—for central air conditioning service. Uses Airmat paper or fibre glass media furnished in rolls.

Washable Type A/C-2 permanent filter for domestic and commercial unit air conditioners. Can be cleaned and re-Viscousined at cost of 5c.



Drifilter Type G contains a filter element made of pleated glass fibre, which is odorless, impervious to humidity and fireproof; may be cleaned several times before having to be replaced.

Multi - Panel automatic with the new armored panel for commercial and industrial air conditioning. Self cleaning — fully automatic.



American Unit Filter—M/W-2 for cleaning recirculated air in central systems; for unit air conditioners and domestic systems.

## A FILTER FOR EVERY DOMESTIC AND COMMERCIAL AIR CONDITIONING NEED

The American Air Filter Company offers a complete line of filters engineered to meet every air cleaning requirement.

The 5 filters shown on this page are but a few of the 150 different items offered in the full line of AAF air cleaning and dust control equipment.

Complete engineering data and bulletins descriptive of every AAF filter are available. Information on any specific air cleaning problem will be furnished gladly by our engineering department without obligation.

**AMERICAN AIR FILTER CO., Inc.**

INCORPORATED

102 Central Avenue, Louisville, Ky.

In Canada: Darling Bros., Ltd.,  
Montreal, P. Q.

*The Symbol of Clean Air*

DUST CONTROL



AIR FILTRATION

# Precalculated Engineering

In past issues a method was given whereby the heat losses of rooms may be calculated by selecting from published tables the construction used and the room size and reading directly the heat loss. Now this Precalculated Engineering is carried to its logical conclusion—additional tables from which pipe sizes are read directly. To do this we must assume selected velocities and register air temperatures. This article is a complete explanation.

By G. A. Voorhees

OF the two recognized methods of duct sizing; (1) the pressure loss method, and (2) the arbitrary velocity method, the latter is often favored for quick estimating because of its simplicity.

In its simplest form, the velocity method of determining duct sizes is based on certain arbitrarily established air velocities in the various parts of the system such as the following given in the 1938 Edition of the ASHVE Guide:

| Description                     | Low Velocity System fpm | Medium Velocity System fpm | High Velocity System fpm |
|---------------------------------|-------------------------|----------------------------|--------------------------|
| Main ducts .....                | 500                     | 750                        | 1000                     |
| Branch ducts .....              | 450                     | 600                        | 750                      |
| Wall stacks .....               | 350                     | 500                        | 600                      |
| Baseboard registers (max).....  | 300                     | 350                        | 400                      |
| Wall reg. above 5 ft. (min.)... | 500                     | 550                        | 600                      |

One of the usual characteristics of such a system is a gradual reduction of velocity from bonnet to register. Thus, it is seen in the above table that, for any one of three systems, highest velocity is in the main trunk with progressively lower velocities in branches, wall stacks and through registers.

The effect of such velocity reduction is to approximate the similar reduction which results automatically when the system is designed according to the more precise friction pressure loss method. Hence, in using the arbitrary velocity method, many experienced designers vary the trunk line velocity. If, for instance, they start with 750 fpm in the trunk at the bonnet, they reduce this to 700 fpm or some other lower velocity after the first few branches are taken off; then reduce the trunk velocity again after several more branches are taken off. They still further approximate the performance of a plant design based on accurate friction pressure loss allowances by assigning different velocities to branch ducts and risers, carrying high-

est velocities in branches and risers near the furnace and progressively lower velocities in those which are more remote.

Thus, if a branch which connects to the main trunk near the furnace has an assigned velocity of 550 fpm the next branch or group of branches further out along the trunk would perhaps be sized for 525 fpm or 500 fpm; still more remote branches might be sized for 475 fpm or 450 fpm.

Following such a procedure and for a duct system without unusual complications, the use of the simple and easily applied velocity method by an experienced engineer will result in duct sizes and plant performance closely allied to those that follow the application of the more elaborate friction pressure loss method.

As a guide to the establishment of velocities in the various parts of a system, the writer offers the following suggestions based on uniformly good results when applied to forced air systems in residences and similar buildings of moderate size, and with the more remote warm air registers not more than 75 feet from the furnace.

1. Register outlet velocities for warm air registers located in the floor or low sidewall registers, 350 fpm.
2. Riser velocities ranging from 550 fpm theoretical maximum to 400 fpm minimum.
3. Branch duct velocities from 650 fpm to 500 fpm.
4. Main trunk velocities from 750 fpm to 600 fpm.

Such velocities (which vary with the length of the run) may be expressed by the following formulas:

$$\text{fpm in riser} = 550 - 2L \quad \text{..... (1)}$$

$$\text{fpm in branch} = 650 - 2L \quad \text{..... (2)}$$

$$\text{fpm in trunk} = 750 - 2L \quad \text{..... (3)}$$

in which L = length of run (or distance in actual

feet) measured along the center line of the duct system from bonnet to register.

By substituting for L in these formulas the number of running feet of duct from furnace to register, the following table is obtained. Note that this table is calculated only to the nearest 25 fpm because there is no practical advantage to be gained by taking into account the slight difference in duct sizes that would result from velocity differences of less magnitude. (Many engineers disregard differences of less than 50 fpm.)

| TABLE 19                      |                 |                  |                 |
|-------------------------------|-----------------|------------------|-----------------|
| Suggested Duct Velocities     |                 |                  |                 |
| Distance Fur.<br>to Reg., Ft. | fpm<br>in Riser | fpm<br>in Branch | fpm<br>in Trunk |
| 0                             | 550             | 650              | 750             |
| 5                             | 550             | 650              | 750             |
| 10                            | 525             | 625              | 725             |
| 15                            | 525             | 625              | 725             |
| 20                            | 500             | 600              | 700             |
| 25                            | 500             | 600              | 700             |
| 30                            | 500             | 600              | 700             |
| 35                            | 475             | 575              | 675             |
| 40                            | 475             | 575              | 675             |
| 45                            | 450             | 550              | 650             |
| 50                            | 450             | 550              | 650             |
| 55                            | 450             | 550              | 650             |
| 60                            | 425             | 525              | 625             |
| 65                            | 425             | 525              | 625             |
| 70                            | 400             | 500              | 600             |
| 75                            | 400             | 500              | 600             |

Having assigned a fixed velocity to a given duct section and knowing the volume of air in cfm which that portion of the duct is to carry, the cross sectional area of the duct may be calculated by means of the basic formula expressing the inter-relation between air volume in cubic feet per minute, the velocity of flow in feet per minute, and cross sectional area of duct in square feet which is:—

$$\text{cfm} = A \times \text{fpm} \dots\dots\dots (4)$$

in which A = cross sectional area in square feet.

For practical purposes, it is customary to express duct area in square inches instead of square feet and since there are 144 square inches to one square foot, the formula becomes:

$$\text{cfm} = \frac{a}{144} \times \text{fpm} \dots\dots\dots (5)$$

in which a = cross sectional area in square inches.

To find velocity corresponding to a given area and volume, formula (5) may be transposed to read:

$$\text{fpm} = \text{cfm} \times \frac{144}{a} \dots\dots\dots (6)$$

The duct area required to carry a given volume at a given velocity is:

$$a = \frac{\text{cfm} \times 144}{\text{fpm}} \dots\dots\dots (7)$$

A convenient table of "area factors" can be easily calculated from formula (7) for the velocities most commonly used, and the formula may be written:

$$a = \text{cfm} \times (\text{area factor based on velocity}) \dots\dots (8)$$

in which the area factor =  $144 \div \text{fpm}$ .

Following is a tabulation of such area factors to

two decimal places corresponding to many of the velocities commonly used in trunk system design:

| TABLE 20                                |             |     |             |
|---|-------------|-----|-------------|
| Table of Area Factors Based on Velocity |             |     |             |
| fpm                                     | Area Factor | fpm | Area Factor |
| 300                                     | 0.48        | 600 | 0.24        |
| 325                                     | 0.44        | 625 | 0.23        |
| 350                                     | 0.41        | 650 | 0.22        |
| 375                                     | 0.38        | 675 | 0.21        |
| 400                                     | 0.36        | 700 | 0.21        |
| 425                                     | 0.34        | 725 | 0.20        |
| 450                                     | 0.32        | 750 | 0.19        |
| 475                                     | 0.30        | 775 | 0.19        |
| 500                                     | 0.29        | 800 | 0.18        |
| 525                                     | 0.27        | 825 | 0.17        |
| 550                                     | 0.26        | 850 | 0.17        |
| 575                                     | 0.25        | 875 | 0.16        |
|   |             | 900 | 0.16        |

If the values given in this table are substituted for velocities in the previous table of Suggested Duct Velocities, (Table 19) we get a table of area factors based on length of run and for practical design purposes, duct velocities can be ignored.

| TABLE 21                                     |                 |        |       |
|--|-----------------|--------|-------|
| Table of Area Factors Based on Length of Run |                 |        |       |
| Distance<br>Furnace to<br>Register<br>Feet   | Area factor for |        |       |
|  | Riser           | Branch | Trunk |
| 0  | 0.26            | 0.22   | 0.19  |
| 5  | 0.26            | 0.22   | 0.19  |
| 10   | 0.27            | 0.23   | 0.20  |
| 15   | 0.27            | 0.23   | 0.20  |
| 20   | 0.29            | 0.24   | 0.21  |
| 25   | 0.29            | 0.24   | 0.21  |
| 30   | 0.29            | 0.24   | 0.21  |
| 35   | 0.30            | 0.25   | 0.21  |
| 40   | 0.30            | 0.25   | 0.21  |
| 45   | 0.32            | 0.26   | 0.22  |
| 50   | 0.32            | 0.26   | 0.22  |
| 55   | 0.32            | 0.26   | 0.22  |
| 60   | 0.34            | 0.27   | 0.23  |
| 65   | 0.34            | 0.27   | 0.23  |
| 70   | 0.36            | 0.29   | 0.24  |
| 75   | 0.36            | 0.29   | 0.24  |

By substituting the appropriate factor from this table in the formula

$$a = \text{cfm} \times (\text{area factor based on length of run}) \dots (9)$$

we are enabled to calculate duct area for a system designed on an arbitrary velocity basis without actually concerning ourselves with the velocity of air flow in the section of duct being considered. This in itself would be a time-saving convenience, but it is introduced here merely as an intermediate step in the logical process of developing a final, quick estimating design table which will give any duct area when the following basic facts are known:

1. The heat requirement of the room in Btu per hour (or more conveniently in *thousands* of Btu per hour)
2. The length of duct in feet from bonnet to register

This brings us to the next step; the determination of cfm requirements. The quantity of heat in Btu per hour delivered to a given room depends



upon the number of pounds of air supplied to the room each hour by the heating plant and *on the register air temperature at which it is delivered.*

It is general practice, however, to measure the air delivery in cubic feet per minute rather than pounds of air per hour. Since the weight in pounds, of a cubic foot of air, is inversely proportional to the air temperature, it is important to know the temperature at which cfm is measured. It was formerly customary to assume that the volume of air in cfm delivered to a given room was measured at the usual room air temperature of 70 degrees, at which temperature a cubic foot of air weighs 0.07495 pounds. Measuring cfm at room air temperature is convenient in determining the number of air changes or recirculations per hour taking place within the room, but it leads to some difficulties in determining air velocity in ducts because the temperature of the air flowing in the duct system is considerably above room air temperature and its volume may be from 10 to 18 percent greater than the cfm measured at room air temperature.

#### Btu, Cfm, R. T. Relationships

For convenience in sizing ducts, the new Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems, therefore, provides that cfm shall be measured at the register air temperature.

The inter-relation between the heat requirement of the room, cfm and register temperature are expressed by the following formula:

$$\text{cfm} = \frac{\text{Btu}}{60 \times d \times 0.24 \times (T_r - 65)} \dots\dots\dots (10)$$

in which

Btu = heat loss of room in Btu per hour

60 = minutes per hour

0.24 = Btu given up by one pound of air in cooling one deg. Fahr.

65 = return air temperature

$T_r$  = register air temperature

$d$  = weight in pounds of one cubic foot of air at reg. temp.

cfm = cubic feet of warm air supplied per minute, measured at register temperature.

Without altering its value, this formula can be written as follows:

$$\text{cfm} = \text{Btu} \times (\text{cfm factor based on Reg. Temp.}) \dots\dots\dots (11)$$

in which

$$(\text{cfm factor}) = \frac{1}{60 \times d \times 0.24 \times (T_r - 65)}$$

A table of cfm factors corresponding to various register air temperatures may be set up as in the following tabulation. In the first column, the register air temperature is given. The second column shows the difference between the register temperature and the assumed return air temperature of 65 degrees; in other words, the number of degrees through which the air cools from the time it enters

at the warm air supply register until it leaves through the return air face at 65 degrees. The third column gives the weight in pounds of one cubic foot of air at the register temperature, these values in the following tabulation being taken from Table 11 of the Second Edition of the Technical Mechanical Heating Code. The cfm factors in the fourth column are obtained by substituting in the above fractional expression, the values in the second and third columns of the table and solving:

For example, for 140° RT we have in equation 11—

$$\text{cfm factor} = \frac{1}{60 \times .0662 \times .24 \times 75} = .01399$$

| Tr  | Tr-65 | d       | cfm factor |
|-----|-------|---------|------------|
| 160 | 95    | 0.6406  | 0.01142    |
| 155 | 90    | 0.0645  | 0.01196    |
| 150 | 85    | 0.0651  | 0.01255    |
| 145 | 80    | 0.06565 | 0.01323    |
| 140 | 75    | 0.0662  | 0.01399    |
| 135 | 70    | 0.06675 | 0.01486    |
| 130 | 65    | 0.06732 | 0.01587    |
| 125 | 60    | 0.0679  | 0.01704    |

Since it is becoming customary for the sake of simplicity in calculation, to deal with heat losses of rooms in *thousands* of Btu per hour, the cfm factors in the above tabulation should also be multiplied by one thousand and the following values are derived:

| TABLE 22                            |            |     |            |
|-------------------------------------|------------|-----|------------|
| Cfm Factors Based on Register Temp. |            |     |            |
| Tr                                  | cfm factor | Tr  | cfm factor |
| 160                                 | 11.42      | 140 | 13.99      |
| 155                                 | 11.96      | 135 | 14.86      |
| 150                                 | 12.55      | 130 | 15.87      |
| 145                                 | 13.23      | 125 | 17.04      |

When this is done, Btu in formula (11) should be changed to Mbh which is the abbreviation recommended by the American Society of Heating and Ventilating Engineers, for the expression "Thousands of Btu per hour." Formula (11) then becomes:—

$$\text{cfm} = \text{Mbh} \times (\text{cfm factor based on Reg. Temp.}) \dots\dots\dots (12)$$

The formula can be further simplified for practical plant design if a relation can be established between the length of the run in feet and the register air temperature. This requires the assumption of (a) a definite bonnet temperature, and (b) the rate of temperature drop between bonnet and register.

There is no agreement among plant designers as to the "best" bonnet temperature. In fact, it is not and cannot be a fixed value which will apply equally well to plants of different types and to buildings of different sizes and constructions. (Several articles the size of this one could be devoted to a discussion of this subject alone).

Neither is there a definite agreement as to the rate of temperature drop between furnace bonnet and register. For a carefully designed plant operating under favorable conditions in a well constructed building, a rate of 0.25 degree (or even

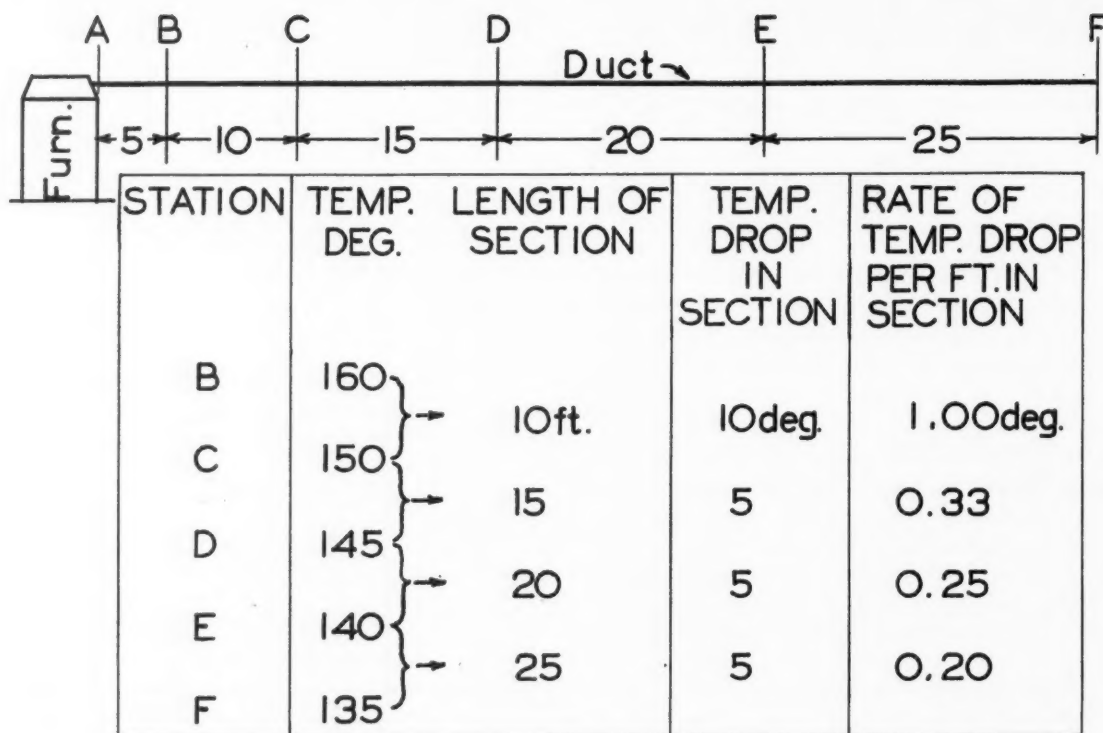


Fig. 1

less) per running foot of duct seems to be satisfactory, and this is the rate recommended in the Technical Mechanical Heating Code.

Professor Konzo has suggested a rate of 0.4 or 0.6 degree per foot and other authorities have recommended rates ranging upward to more than one degree per foot.

For a number of winters past, the writer has made it a practice to take temperature readings of air flowing in duct systems in actual operation under both favorable and unfavorable conditions, and it has been noticeable in most cases that the rate of temperature drop per foot of duct length tends to be greater near the bonnet than at the more remote points in the system. Furthermore, the average job inspected showed a temperature drop in excess of 0.25 degree per foot—especially in older houses where existing plants had been converted from gravity to mechanical circulation.

#### High Register Temperature

From the results of such temperature readings covering a rather wide range of operating conditions, an effort was made to set up a tentative schedule of temperatures to be expected at registers at various distances from the furnace bonnet. The temperatures thus adopted as "standard" and which are believed to contain reasonably ample safety factors, are shown in Fig. 1.

Some designers will object to the assumption of a register temperature as high as 160 degrees which the schedule in Fig. 1 shows for a register 5 feet from the bonnet. Three specific comments may be made regarding this:

First, there can be very honest differences of

opinion as to the most desirable register temperature to use as a design basis. Undoubtedly, a plant which is automatically fired, especially if it uses gas or oil, can well be designed for a lower register temperature than a plant having a hand-fired coal burning furnace. It is even more certain that a heavily insulated house *must* have a plant designed for lower register temperatures than an uninsulated house—otherwise, there will be pronounced air temperature stratification within the room with excessively high air temperatures at and near the ceiling, and correspondingly low temperatures near the floor.

Second, every experienced designer of warm air heating plants who has made a practice of testing his jobs for register temperature after installations have been made and the plant put in operation, will probably agree that the *actual* register air temperatures are found to be lower than the temperatures which were assumed as a design basis. There are several reasons for this condition. One is that the outside temperature chosen as the basis for calculating heat requirement is usually very much lower than the average outdoor temperature during the winter season. Consequently, the heat requirement of a given room under actual operating conditions is very much less than its calculated requirements except for a very few days—or even a few hours—during the winter, and with a hand-fired furnace the combustion rate is, therefore, much less than the theoretical design rate, and with this lower rate of heat generation prevailing, the actual register air temperatures are correspondingly reduced below the design basis.

Third, a considerable quantity of "vagrant" heat finds its way to the rooms and helps to offset the

**TABLE 24**  
**Design Factors**  
(Square Inches of free area required per thousand Btu per hour heat requirement)

| Length of Run<br>In feet from<br>Bonnet to Reg. | Reg.<br>Air<br>Temp. | Reg.<br>Vel.<br>FPM | Reg.<br>Factor | Riser<br>Vel.<br>FPM | Riser<br>Factor | Branch<br>Vel.<br>FPM | Branch<br>Factor | Trunk<br>Vel.<br>FPM | Trunk<br>Factor |
|---|----------------------|---------------------|----------------|----------------------|-----------------|-----------------------|------------------|----------------------|-----------------|
| 5   | 160                  | 350                 | 4.7            | 550                  | 3.0             | 650                   | 2.5              | 750                  | 2.2             |
| 15  | 150                  | 350                 | 5.2            | 525                  | 3.4             | 625                   | 2.9              | 725                  | 2.5             |
| 30  | 145                  | 350                 | 5.5            | 500                  | 3.8             | 600                   | 3.2              | 700                  | 2.7             |
| 50  | 140                  | 350                 | 5.8            | 450                  | 4.5             | 550                   | 3.6              | 650                  | 3.1             |
| 75  | 135                  | 350                 | 6.2            | 400                  | 5.3             | 500                   | 4.3              | 600                  | 3.6             |

heat loss. This heat which enters a given room through various paths reduces the quantity of heat required to be delivered through the warm air register and with a hand fired furnace, this means a lower combustion rate and lower operating register air temperature.

A valid objection may be made to the assumption (Fig. 1) that if the temperature at register B, five feet from the bonnet, is 160 degrees, the temperature at register C, which is 15 feet from the bonnet, will be 150 degrees. This means an average drop of one degree per foot in this ten foot section, which is relatively high in comparison with the assumed rate of 0.33 degrees per foot of duct in the next section CD. On the other hand, most of us who have had "trouble jobs" to contend with, will probably agree that in adjusting such jobs to bring about uniform room air temperatures, there is seldom any difficulty with rooms close to the furnace. Most of the trouble is met in providing ample heat for the more remote rooms. Consequently, the design assumption of relatively high register temperatures near the furnace and relatively low register temperatures for the more remote registers provides a "safety factor" which will entirely eliminate some trouble jobs.

The design basis assumption of register temperatures ranging from 160 degrees for registers 5 feet from the bonnet down to 135 degrees for registers 75 feet from the bonnet has actually worked out very satisfactorily in practice—and after all, practical heating results is what we are after.

The reader who prefers some other basis for estimating register temperature variations according to distances between bonnet and register can easily compile his own tables, and the explanations of the different steps are purposely given in some detail in this article to serve as a guide to the calculation of similar tables on any desired basis of register temperature and velocity.

From Table 22, which gives cfm factors based on register temperature, the following table is compiled for five different lengths of runs which have been chosen as the basis for setting up the complete design tables.

| <b>TABLE 23</b><br><b>Cfm Factors Based on Length of Run</b> |  |   |
|--|--|---|
| Length of Run<br>from Bonnet<br>to Register                  | Regular Temp.<br>Corresponding to<br>length of Run | CFM Factor<br>based on<br>length of Run |
| 5  | 160  | 11.42                                   |
| 15   | 150  | 12.55                                   |
| 30   | 145  | 13.23                                   |
| 50   | 140  | 13.99                                   |
| 75   | 135  | 14.86                                   |

From this table and Table 21, giving area factors based on length of run, we may select values which will give the required duct area corresponding to any combination of heat loss in Mbh and length of run in feet, and determine area by substituting in the formula:

$$a = \text{Mbh} \times \left( \frac{\text{cfm factor based on length of run from Table 23}}{\text{cfm factor based on length of run from Table 21}} \right) \times \left( \frac{\text{area factor based on length of run from Table 21}}{\text{area factor based on length of run from Table 23}} \right) \dots (13)$$

For a given type and location of warm air supply register, a fixed velocity through the free area of the grill is usually assumed; for example, 300 fpm or 350 fpm through a floor, baseboard or low side wall register, and 500 fpm or more for high side wall location.

Hence for register free opening:

$$a = \text{Mbh} \times \left( \frac{\text{cfm factor based on length of run from Table 23}}{\text{cfm factor based on length of run from Table 20}} \right) \times \left( \frac{\text{area factor based on velocity from Table 20}}{\text{area factor based on velocity from Table 23}} \right) \dots (14)$$

By substituting the appropriate factors from Tables 21 and 23 in formula (13) and from Tables 20 and 23 in formula (14), a final table of design factors (Table 24) may be compiled and a similar table may be set up for any desired combination of velocities and register temperatures *other* than those suggested in this article.

Each factor in such a table is the *number of square inches of free area needed to supply 1,000 Btu per hour to the room*. Thus the riser factor in Table 24 for a register 30 feet from the bonnet is 3.8 and if the room has a heat loss of 11,000 Btu per hour (11 Mbh) the required riser area is  $11 \times 3.8 = 42$  square inches.

Tables 25 to 29, inclusive, give *without further figuring* the various areas required (also cfm for register temperatures shown in the tables) for rooms having heat losses ranging from 4,000 to 100,000 Btu per hour (4 to 100 Mbh).

#### How to Use Precalculated Tables

The method of using design tables Nos. 25 to 29, inclusive, is indicated by the following example:

Assume a five room house, the rooms having the heat losses in thousands of Btu per hour (Mbh) as shown in the second column of the schedule in Fig. 2.

First, make a diagram (not necessarily drawn to scale) showing the furnace location and the relative locations of the various registers with the connecting trunk line and branches as shown in the diagram of Fig. 2.

Then list the rooms by number or otherwise and show the heat loss of each room as in the first two columns of the schedule in Fig. 2.

If drawn to scale, measure—otherwise estimate, the approximate number of running feet of duct from



TABLE 25

*For Register 5 Feet from Furnace*

| HEAT<br>LOSS<br>Thou-<br>sands<br>of Btu<br>per<br>hour | REGIS-<br>TERS<br>& Return<br>Air Faces,<br>free area.<br>Also stud-<br>ding spaces<br>used for<br>Returns<br>350 FPM | RISERS<br>Supply or<br>Return.<br>Also<br>panned<br>joist<br>spaces<br>used for<br>Returns<br>550 FPM | BRANCH<br>from<br>Supply<br>or<br>Return<br>Trunk<br>650 FPM | TRUNK<br>Line<br>Duct,<br>Supply<br>or<br>Return<br>750 FPM | CFM<br>at<br>Reg.<br>160<br>Deg. |
|---|---|---|--|---|----------------------------------|
| 4   | 19  | 12  | 10   | 9   | 46                               |
| 4.5   | 21  | 14  | 11   | 10  | 51                               |
| 5   | 24  | 15  | 13   | 11  | 57                               |
| 5.5   | 26  | 17  | 14   | 12  | 63                               |
| 6   | 28  | 18  | 15   | 13  | 68                               |
| 6.5   | 31  | 19  | 17   | 14  | 74                               |
| 7   | 33  | 21  | 18   | 15  | 80                               |
| 7.5   | 36  | 22  | 19   | 16  | 86                               |
| 8   | 38  | 24  | 20   | 18  | 91                               |
| 8.5   | 40  | 25  | 22   | 19  | 97                               |
| 9   | 43  | 27  | 23   | 20  | 103                              |
| 9.5   | 45  | 28  | 24   | 21  | 108                              |
| 10  | 47  | 30  | 25   | 22  | 114                              |
| 11  | 52  | 33  | 28   | 24  | 126                              |
| 12  | 57  | 36  | 30   | 26  | 137                              |
| 13  | 62  | 39  | 33   | 28  | 148                              |
| 14  | 66  | 42  | 35   | 31  | 160                              |
| 15  | 71  | 45  | 38   | 33  | 171                              |
| 16  | 76  | 48  | 41   | 35  | 183                              |
| 17  | 80  | 51  | 43   | 37  | 194                              |
| 18  | 85  | 54  | 46   | 39  | 205                              |
| 19  | 90  | 57  | 48   | 42  | 217                              |
| 20  | 94  | 60  | 51   | 44  | 228                              |
| 21  | 99  | 63  | 53   | 46  | 240                              |
| 22  | 104   | 66  | 56   | 48  | 251                              |
| 23  | 109   | 69  | 58   | 50  | 263                              |
| 24  | 114   | 72  | 61   | 52  | 274                              |
| 25  | 118   | 75  | 63   | 55  | 285                              |
| 26  | 123   | 78  | 66   | 57  | 297                              |
| 27  | 128   | 81  | 68   | 59  | 308                              |
| 28  | 133   | 84  | 71   | 61  | 320                              |
| 29  | 137   | 87  | 73   | 64  | 331                              |
| 30  | 142   | 90  | 76   | 66  | 342                              |
| 31  | 147   | 93  | 79   | 68  | 354                              |
| 32  | 152   | 96  | 81   | 70  | 365                              |
| 33  | 156   | 99  | 84   | 72  | 377                              |
| 34  | 161   | 102   | 86   | 75  | 388                              |
| 35  | 166   | 105   | 89   | 77  | 400                              |
| 36  | 171   | 108   | 91   | 79  | 411                              |
| 37  | 175   | 111   | 94   | 81  | 422                              |
| 38  | 180   | 114   | 96   | 83  | 434                              |
| 39  | 185   | 117   | 99   | 85  | 445                              |
| 40  | 189   | 120   | 101  | 88  | 457                              |
| 41  | 194   | 123   | 104  | 90  | 468                              |
| 42  | 199   | 126   | 106  | 92  | 479                              |
| 43  | 204   | 129   | 109  | 94  | 491                              |
| 44  | 208   | 132   | 112  | 96  | 502                              |
| 45  | 213   | 135   | 114  | 99  | 514                              |
| 46  | 218   | 138   | 117  | 101   | 525                              |
| 47  | 223   | 141   | 119  | 103   | 537                              |
| 48  | 227   | 144   | 122  | 105   | 548                              |
| 49  | 232   | 147   | 124  | 107   | 559                              |
| 50  | 237   | 150   | 127  | 110   | 571                              |
| 55  | 261   | 165   | 139  | 121   | 628                              |
| 60  | 284   | 179   | 152  | 132   | 685                              |
| 65  | 308   | 194   | 165  | 142   | 742                              |
| 70  | 332   | 209   | 177  | 153   | 799                              |
| 75  | 355   | 224   | 190  | 164   | 856                              |
| 80  | 378   | 239   | 203  | 175   | 913                              |
| 85  | 403   | 254   | 215  | 186   | 970                              |
| 90  | 426   | 269   | 228  | 197   | 1027                             |
| 95  | 450   | 284   | 241  | 208   | 1084                             |
| 100   | 474   | 299   | 252  | 219   | 1142                             |

TABLE 26

*For Register 15 Feet from Furnace*

| HEAT<br>LOSS<br>Thou-<br>sands<br>of Btu<br>per<br>hour | REGIS-<br>TERS<br>& Return<br>Air Faces,<br>free area.<br>Also stud-<br>ding spaces<br>used for<br>Returns<br>350 FPM | RISERS<br>Supply or<br>Return.<br>Also<br>panned<br>joist<br>spaces<br>used for<br>Returns<br>550 FPM | BRANCH<br>from<br>Supply<br>or<br>Return<br>Trunk<br>625 FPM | TRUNK<br>Line<br>Duct,<br>Supply<br>or<br>Return<br>725 FPM | CFM<br>at<br>Reg.<br>150<br>Deg. |
|---|---|---|--|---|----------------------------------|
| 4   | 21  | 14  | 12   | 10  | 50                               |
| 4.5   | 23  | 16  | 13   | 11  | 56                               |
| 5   | 26  | 17  | 14   | 12  | 63                               |
| 5.5   | 29  | 19  | 16   | 14  | 69                               |
| 6   | 31  | 21  | 17   | 15  | 75                               |
| 6.5   | 34  | 22  | 19   | 16  | 82                               |
| 7   | 36  | 24  | 20   | 17  | 88                               |
| 7.5   | 39  | 26  | 22   | 19  | 94                               |
| 8   | 42  | 28  | 23   | 20  | 100                              |
| 8.5   | 44  | 29  | 25   | 21  | 107                              |
| 9   | 47  | 31  | 26   | 22  | 113                              |
| 9.5   | 50  | 33  | 28   | 24  | 119                              |
| 10  | 52  | 34  | 29   | 25  | 125                              |
| 11  | 57  | 38  | 32   | 27  | 138                              |
| 12  | 62  | 41  | 35   | 30  | 151                              |
| 13  | 68  | 45  | 38   | 32  | 163                              |
| 14  | 73  | 48  | 41   | 35  | 176                              |
| 15  | 78  | 52  | 43   | 37  | 188                              |
| 16  | 83  | 55  | 46   | 40  | 201                              |
| 17  | 89  | 58  | 49   | 42  | 213                              |
| 18  | 94  | 62  | 52   | 45  | 226                              |
| 19  | 99  | 65  | 55   | 47  | 238                              |
| 20  | 104   | 69  | 58   | 50  | 251                              |
| 21  | 109   | 72  | 61   | 52  | 263                              |
| 22  | 115   | 76  | 64   | 55  | 276                              |
| 23  | 120   | 79  | 67   | 57  | 289                              |
| 24  | 125   | 83  | 70   | 60  | 301                              |
| 25  | 130   | 86  | 72   | 62  | 314                              |
| 26  | 135   | 89  | 75   | 65  | 326                              |
| 27  | 141   | 93  | 78   | 67  | 339                              |
| 28  | 146   | 96  | 81   | 70  | 351                              |
| 29  | 151   | 100   | 84   | 72  | 364                              |
| 30  | 156   | 103   | 87   | 75  | 376                              |
| 31  | 161   | 107   | 90   | 77  | 389                              |
| 32  | 167   | 110   | 93   | 80  | 402                              |
| 33  | 172   | 113   | 96   | 82  | 414                              |
| 34  | 177   | 117   | 99   | 85  | 427                              |
| 35  | 182   | 120   | 101  | 87  | 439                              |
| 36  | 187   | 124   | 104  | 90  | 452                              |
| 37  | 193   | 127   | 107  | 92  | 464                              |
| 38  | 198   | 131   | 110  | 95  | 477                              |
| 39  | 203   | 134   | 113  | 97  | 489                              |
| 40  | 208   | 138   | 116  | 100   | 502                              |
| 41  | 213   | 141   | 119  | 102   | 514                              |
| 42  | 219   | 144   | 122  | 105   | 527                              |
| 43  | 224   | 148   | 125  | 107   | 540                              |
| 44  | 229   | 151   | 128  | 110   | 552                              |
| 45  | 234   | 155   | 130  | 112   | 565                              |
| 46  | 240   | 158   | 133  | 115   | 577                              |
| 47  | 245   | 162   | 136  | 117   | 590                              |
| 48  | 250   | 165   | 139  | 120   | 602                              |
| 49  | 255   | 168   | 142  | 122   | 615                              |
| 50  | 260   | 172   | 145  | 125   | 627                              |
| 55  | 286   | 189   | 159  | 137   | 690                              |
| 60  | 312   | 206   | 174  | 150   | 753                              |
| 65  | 338   | 223   | 188  | 162   | 816                              |
| 70  | 364   | 241   | 203  | 175   | 878                              |
| 75  | 391   | 258   | 217  | 187   | 941                              |
| 80  | 417   | 275   | 232  | 200   | 1004                             |
| 85  | 443   | 292   | 246  | 212   | 1066                             |
| 90  | 469   | 309   | 261  | 225   | 1129                             |
| 95  | 495   | 326   | 275  | 237   | 1192                             |
| 100   | 521   | 344   | 290  | 250   | 1255                             |

TABLE 27

For Register 30 Feet from Furnace

| HEAT<br>LOSS<br>Thou-<br>sands<br>of Btu<br>per<br>hour | REGIS-<br>TERS<br>& Return<br>Air Faces,<br>free area.<br>Also stud-<br>ding spaces<br>used for<br>Returns<br>350 FPM | RISERS<br>Supply or<br>Return.<br>Also<br>panned<br>joist<br>spaces<br>used for<br>Returns<br>500 FPM | BRANCH<br>from<br>Supply<br>or<br>Return<br>Trunk<br>600 FPM | TRUNK<br>Line<br>Duct,<br>Supply<br>or<br>Return<br>700 FPM | CFM<br>at<br>Reg.<br>Temp.<br>145<br>Deg. |
|---|---|---|--|---|---|
| 4   | 22  | 15  | 13   | 11  | 53  |
| 4.5   | 25  | 17  | 14   | 12  | 60  |
| 5   | 27  | 19  | 16   | 14  | 66  |
| 5.5   | 30  | 21  | 18   | 15  | 73  |
| 6   | 33  | 23  | 19   | 16  | 79  |
| 6.5   | 36  | 25  | 21   | 18  | 86  |
| 7   | 38  | 27  | 22   | 19  | 93  |
| 7.5   | 41  | 29  | 24   | 20  | 99  |
| 8   | 44  | 30  | 25   | 22  | 106                                       |
| 8.5   | 47  | 32  | 27   | 23  | 112                                       |
| 9   | 49  | 34  | 29   | 25  | 119                                       |
| 9.5   | 52  | 36  | 30   | 26  | 126                                       |
| 10  | 55  | 38  | 32   | 27  | 132                                       |
| 11  | 60  | 42  | 35   | 30  | 146                                       |
| 12  | 66  | 46  | 38   | 33  | 159                                       |
| 13  | 71  | 50  | 41   | 35  | 172                                       |
| 14  | 77  | 53  | 44   | 38  | 185                                       |
| 15  | 82  | 57  | 48   | 41  | 198                                       |
| 16  | 88  | 61  | 51   | 44  | 212                                       |
| 17  | 93  | 65  | 54   | 46  | 225                                       |
| 18  | 99  | 69  | 57   | 49  | 238                                       |
| 19  | 104   | 72  | 60   | 52  | 251                                       |
| 20  | 110   | 76  | 63   | 54  | 265                                       |
| 21  | 115   | 80  | 67   | 57  | 278                                       |
| 22  | 121   | 84  | 70   | 60  | 291                                       |
| 23  | 126   | 88  | 73   | 63  | 304                                       |
| 24  | 132   | 91  | 76   | 65  | 317                                       |
| 25  | 137   | 95  | 79   | 68  | 331                                       |
| 26  | 143   | 99  | 83   | 71  | 344                                       |
| 27  | 148   | 103   | 86   | 74  | 357                                       |
| 28  | 154   | 107   | 89   | 76  | 370                                       |
| 29  | 159   | 110   | 92   | 79  | 384                                       |
| 30  | 165   | 114   | 95   | 82  | 397                                       |
| 31  | 170   | 118   | 98   | 84  | 410                                       |
| 32  | 176   | 122   | 102  | 87  | 423                                       |
| 33  | 181   | 126   | 105  | 90  | 437                                       |
| 34  | 187   | 130   | 108  | 93  | 450                                       |
| 35  | 192   | 133   | 111  | 95  | 463                                       |
| 36  | 198   | 137   | 114  | 98  | 476                                       |
| 37  | 203   | 141   | 117  | 101   | 489                                       |
| 38  | 209   | 145   | 121  | 104   | 503                                       |
| 39  | 214   | 149   | 124  | 106   | 516                                       |
| 40  | 220   | 152   | 127  | 109   | 529                                       |
| 41  | 225   | 156   | 130  | 112   | 542                                       |
| 42  | 231   | 160   | 133  | 114   | 556                                       |
| 43  | 236   | 164   | 137  | 117   | 569                                       |
| 44  | 242   | 168   | 140  | 120   | 582                                       |
| 45  | 247   | 171   | 143  | 123   | 595                                       |
| 46  | 253   | 175   | 146  | 125   | 608                                       |
| 47  | 258   | 179   | 149  | 128   | 622                                       |
| 48  | 263   | 183   | 152  | 131   | 635                                       |
| 49  | 269   | 187   | 156  | 134   | 648                                       |
| 50  | 274   | 190   | 159  | 136   | 661                                       |
| 55  | 302   | 210   | 175  | 150   | 728                                       |
| 60  | 329   | 229   | 190  | 163   | 794                                       |
| 65  | 357   | 248   | 206  | 177   | 860                                       |
| 70  | 384   | 267   | 222  | 191   | 926                                       |
| 75  | 412   | 286   | 238  | 204   | 992                                       |
| 80  | 439   | 305   | 254  | 218   | 1058                                      |
| 85  | 467   | 324   | 270  | 232   | 1124                                      |
| 90  | 494   | 343   | 286  | 245   | 1190                                      |
| 95  | 521   | 362   | 302  | 259   | 1257                                      |
| 100   | 549   | 381   | 317  | 272   | 1323                                      |

TABLE 28

For Register 50 Feet from Furnace

| HEAT<br>LOSS<br>Thou-<br>sands<br>of Btu<br>per<br>hour | REGIS-<br>TERS<br>& Return<br>Air Faces,<br>free area.<br>Also stud-<br>ding spaces<br>used for<br>Returns<br>350 FPM | RISERS<br>Supply or<br>Return.<br>Also<br>panned<br>joist<br>spaces<br>used for<br>Returns<br>450 FPM | BRANCH<br>from<br>Supply<br>or<br>Return<br>Trunk<br>550 FPM | TRUNK<br>Line<br>Duct,<br>Supply<br>or<br>Return<br>650 FPM | CFM<br>at<br>Reg.<br>Temp.<br>140<br>Deg. |
|---|---|---|--|---|---|
| 4   | 23  | 18  | 15   | 12  | 56  |
| 4.5   | 26  | 20  | 16   | 14  | 63  |
| 5   | 29  | 22  | 18   | 16  | 70  |
| 5.5   | 32  | 25  | 20   | 17  | 77  |
| 6   | 35  | 27  | 22   | 19  | 84  |
| 6.5   | 38  | 29  | 24   | 20  | 91  |
| 7   | 41  | 31  | 26   | 22  | 98  |
| 7.5   | 44  | 34  | 27   | 23  | 105                                       |
| 8   | 46  | 36  | 29   | 25  | 112                                       |
| 8.5   | 49  | 38  | 31   | 26  | 119                                       |
| 9   | 52  | 40  | 33   | 28  | 126                                       |
| 9.5   | 55  | 43  | 35   | 30  | 133                                       |
| 10  | 58  | 45  | 36   | 31  | 140                                       |
| 11  | 64  | 49  | 40   | 34  | 154                                       |
| 12  | 70  | 54  | 44   | 37  | 168                                       |
| 13  | 75  | 58  | 47   | 40  | 182                                       |
| 14  | 81  | 63  | 51   | 43  | 196                                       |
| 15  | 87  | 67  | 55   | 47  | 210                                       |
| 16  | 93  | 72  | 58   | 50  | 224                                       |
| 17  | 99  | 76  | 62   | 53  | 238                                       |
| 18  | 104   | 81  | 66   | 56  | 252                                       |
| 19  | 110   | 85  | 69   | 59  | 266                                       |
| 20  | 116   | 90  | 73   | 62  | 280                                       |
| 21  | 122   | 94  | 77   | 65  | 294                                       |
| 22  | 128   | 98  | 80   | 68  | 308                                       |
| 23  | 133   | 103   | 84   | 71  | 322                                       |
| 24  | 139   | 107   | 87   | 74  | 336                                       |
| 25  | 145   | 112   | 91   | 78  | 350                                       |
| 26  | 151   | 116   | 95   | 81  | 364                                       |
| 27  | 157   | 121   | 98   | 84  | 378                                       |
| 28  | 163   | 125   | 102  | 87  | 392                                       |
| 29  | 168   | 130   | 106  | 90  | 406                                       |
| 30  | 174   | 134   | 109  | 93  | 420                                       |
| 31  | 180   | 139   | 113  | 96  | 434                                       |
| 32  | 186   | 143   | 117  | 99  | 448                                       |
| 33  | 192   | 148   | 120  | 102   | 462                                       |
| 34  | 197   | 152   | 124  | 106   | 476                                       |
| 35  | 203   | 157   | 128  | 109   | 490                                       |
| 36  | 209   | 161   | 131  | 112   | 503                                       |
| 37  | 215   | 166   | 135  | 115   | 517                                       |
| 38  | 221   | 170   | 138  | 118   | 531                                       |
| 39  | 226   | 175   | 142  | 121   | 545                                       |
| 40  | 232   | 179   | 146  | 124   | 559                                       |
| 41  | 238   | 184   | 149  | 127   | 573                                       |
| 42  | 244   | 188   | 153  | 130   | 587                                       |
| 43  | 250   | 192   | 157  | 133   | 601                                       |
| 44  | 255   | 197   | 160  | 136   | 615                                       |
| 45  | 261   | 201   | 164  | 140   | 629                                       |
| 46  | 267   | 206   | 168  | 143   | 643                                       |
| 47  | 273   | 210   | 171  | 146   | 657                                       |
| 48  | 279   | 215   | 175  | 149   | 671                                       |
| 49  | 284   | 219   | 179  | 152   | 685                                       |
| 50  | 290   | 224   | 182  | 155   | 699                                       |
| 55  | 319   | 246   | 200  | 171   | 769                                       |
| 60  | 348   | 269   | 219  | 186   | 839                                       |
| 65  | 377   | 291   | 237  | 202   | 909                                       |
| 70  | 406   | 313   | 255  | 217   | 979                                       |
| 75  | 435   | 336   | 273  | 233   | 1049                                      |
| 80  | 464   | 358   | 292  | 248   | 1119                                      |
| 85  | 493   | 380   | 310  | 264   | 1188                                      |
| 90  | 522   | 403   | 328  | 279   | 1259                                      |
| 95  | 551   | 425   | 346  | 295   | 1329                                      |
| 100   | 580   | 448   | 364  | 310   | 1399                                      |

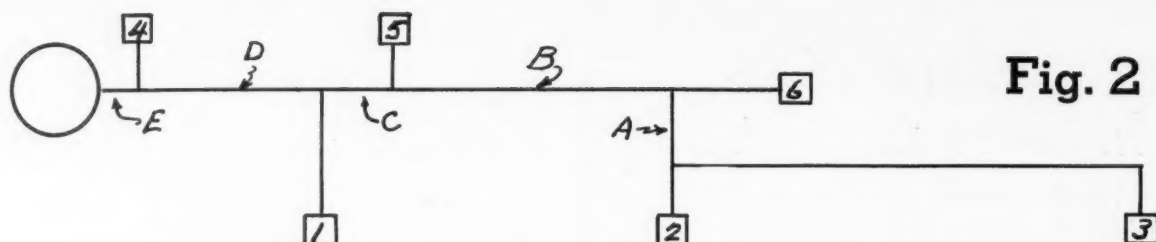


Fig. 2

| ROOM | HEAT LOSS<br>Mbh | DIST.<br>BONNET<br>TO REG.<br>FEET | TABLE<br>NO. | REGISTER<br>FREE<br>AREA | RISER<br>AREA | BRANCH<br>AREA | TRUNK<br>AREA | C F M |
|------|------------------|------------------------------------|--------------|--------------------------|---------------|----------------|---------------|-------|
| 1    | 12               | 17                                 | 26           | 62                       | 41            | 35             | 30            | 151   |
| 2    | 9.5              | 28                                 | 27           | 52                       | 36            | 30             | 26            | 126   |
| 3    | 14               | 44                                 | 28           | 81                       | 63            | 51             | 43            | 196   |
| 4    | 10               | 6                                  | 25           | 47                       | 30            | 25             | 22            | 114   |
| 5    | 14               | 17                                 | 26           | 73                       | 48            | 41             | 35            | 176   |
| 6    | 17               | 34                                 | 27           | 93                       | 65            | 54             | 46            | 225   |

988

furnace bonnet to each of the registers and record these values in the third column.

In the fourth column, record the number of the table which is to be used for sizing the ducts to each of the rooms. Room No. 1 shows an approximate duct length of 17-ft. and, since Table 26 is for a 15-foot run, this is obviously the table to use for this room. Room No. 3 has a 44-foot run and Table No. 28 for 50-foot run is therefore suitable. In a similar manner, the tables for the other rooms should be recorded in the schedule.

For room No. 1, refer to Table No. 26 and in the left hand column of that table, locate the heat loss of the room, 12 Mbh. In the same horizontal line with the heat loss 12, it is seen that the register free area is 62 sq. inches. Record this in the register area column.

The next column of Table 26 shows that the riser area corresponding to a heat loss of 12 Mbh should be 41 square inches and this is to be recorded in the riser area column of the schedule.

In a like manner, record 35 square inches, which is the branch area, 30 square inches for trunk area, and in the last column of the schedule, 151 cfm.

In the same manner, complete the schedule for all the other rooms.

The total of the cfm column in the schedule gives the air volume that the blower must supply. The total of the heat loss column gives the quantity of heat in thousands of Btu per hour which the furnace must supply at the registers.

The trunk duct is sized as follows:

Starting with the most remote section of the trunk, Section A in this case, the diagram (Fig. 2) shows that this trunk section supplies the branches to rooms 2 and 3. The schedule shows that room 2 requires 26 square inches of trunk area and room 3 requires 43 square inches, or a total of 69 square inches for trunk section A.

It is not necessary to determine the air volume in cfm which is carried by each section of the trunk line, but some designers prefer to do so for convenience in checking up on trunk line velocities. In this case, the schedule shows that room 2 requires 126 cfm and room 3 requires 196 cfm, making a total of 322 cfm in the section. According to Formula (6), the air velocity in this trunk section will be:

$$\frac{322 \times 144}{69} = 670$$

Trunk section B supplies trunk section A and room 6. It has just been determined that the cross sectional area of trunk section A is 69 inches and, since the schedule in Fig. 2 shows that room 6 requires a trunk area of 46 square inches, trunk section B requires a total area of  $69 + 46 = 115$  square inches. Continue in the same manner to size all the other trunk sections. For convenience, the following table is given to show how this has been worked out:

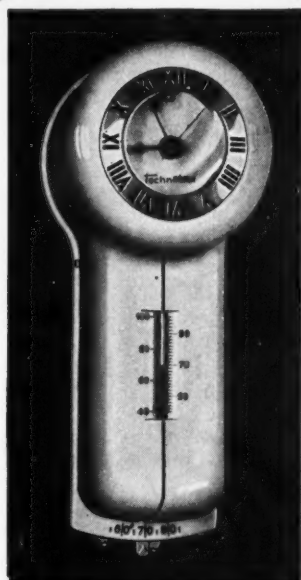
| Trunk Section | Supplying | Trunk Area | CFM | ftm from Formula (6)               |
|---------------|-----------|------------|-----|------------------------------------|
| A             | Room 2    | 26         | 126 | $\frac{322 \times 144}{69} = 670$  |
|               | Room 3    | 43         | 196 |                                    |
| B             |           | 69         | 322 | $\frac{547 \times 144}{115} = 685$ |
|               | Section A | 69         | 322 |                                    |
|               | Room 6    | 46         | 225 |                                    |
| C             |           | 115        | 547 | $\frac{723 \times 144}{150} = 695$ |
|               | Section B | 115        | 547 |                                    |
|               | Room 5    | 35         | 176 |                                    |
| D             |           | 150        | 723 | $\frac{874 \times 144}{180} = 700$ |
|               | Section C | 150        | 723 |                                    |
|               | Room 1    | 30         | 151 |                                    |
| E             |           | 180        | 874 | $\frac{988 \times 144}{202} = 705$ |
|               | Section D | 180        | 874 |                                    |
|               | Room 4    | 22         | 114 |                                    |
|               |           | 202        | 988 |                                    |

[Table 29 is on page 148]



# MASTER

## ACCURACY-EFFICIENCY LONG LIFE . . . . .



### Technotrol

Furnished in Ivory or black molded cases, Technotrol combines distinctive beauty with a fine instrument of precision. Responsive to minute changes in temperature, Technotrol is available in either the Type C-22 two-position model or the famous Type C-144 gradual control model. Also furnished with snap action contacts for 2 or 3 wire low voltage control systems.

### TYPE B-144 Gradual Control

An instrument of precision, performance and long life, it has four-position smoothness together with the unequalled sensitiveness of Master's patented Thermo-Wafer. Contacts are platinum-iridium. Special non-inductive thermal starting switch requires less than 3 watts. The four-pole induction motor operates at 16 volts through a special low-reactance type of transformer. Listed as standard by Underwriters' Laboratories.

### TYPE B-22 Two Position

A MASTER instrument with the appearance, accuracy and reliability characteristic of the entire line. Priced for the greatest market of all—moderate salaried home owners. Has fine silver contacts, and 1 degree temperature range response. Motor is quiet with ample power to lift any damper.

*In addition to standard line, we furnish quotations on regulators for special applications. We also manufacture the Type B-22-A and B-22-W Limit controls, and the Master Triptrol—a control system for warm air plants equipped with blowers.*

WRITE FOR FURTHER INFORMATION

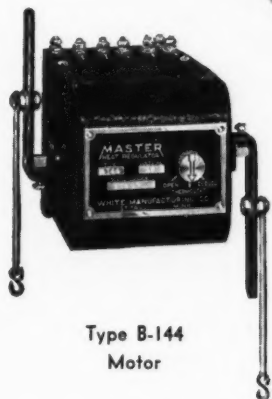
**The WHITE MFG. Co.**

2362 University Ave.

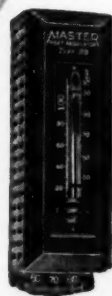
St. Paul, Minn.



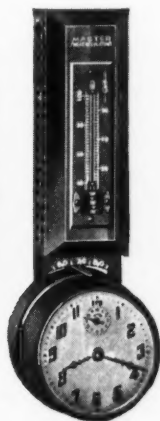
Plain  
Model



Type B-144  
Motor



Plain  
Model



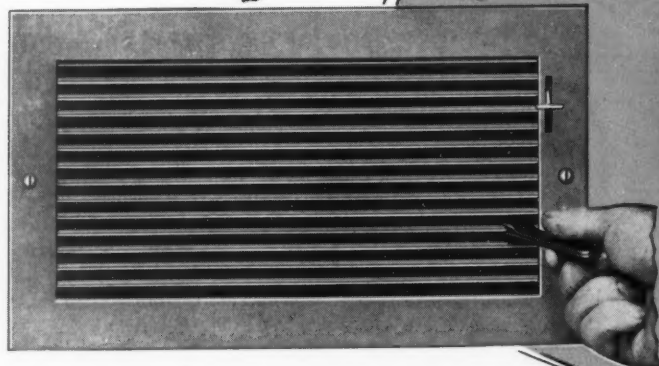
1-day Clock  
Model



Type B-22  
Motor

**MASTER**  
HEAT REGULATOR

*Built for People who Care about*



**QUALITY**

*Showing easy adjustment of Fin-Flex Register.*

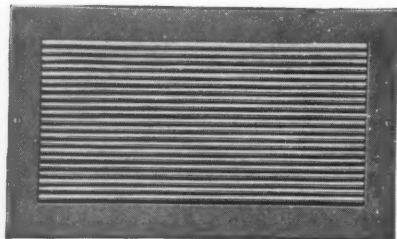
Any Auer Register is a trustworthy product. While sensibly priced, Auer Registers are primarily built for people who want no cheapening of the essential qualities that make registers last long and function properly. For balanced beauty, for enduring quality—Auer is your register.

Fin-Flex Registers and Grilles are made with either vertical or horizontal fins, easily adjusted at installation for single or multiple current in any direction. Dura-Flo Registers and Grilles also have blades adjustable for any desired air flow. Fin-Flo Registers and Grilles come with either vertical or horizontal fins for any specified air flow, and are not

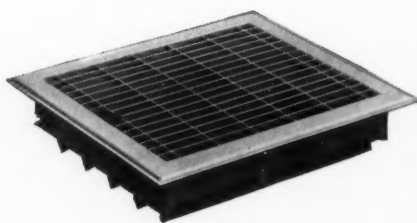
adjustable. DuraBilt Floor Registers and Cold Air Faces are assembled with steel cross-bar construction, and should be used where extra strength is required. These modern faces, together with the popular "Classic" design, afford a wide choice for all air conditioning purposes.

New Auer Register Book No. 39 shows a wide variety of types for air conditioning or gravity heating. Ask for a copy.

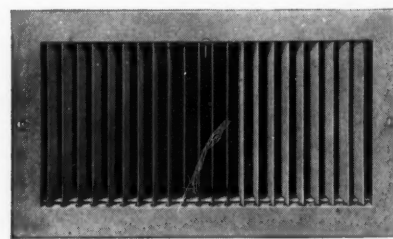
THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO



*Fin-Flo Register (also furnished with vertical fins).*



*DuraBilt design, furnished for registers and intakes, standard or narrow mesh.*



*Dura-Flo Register, also made with horizontal adjustable bars.*

**AUER** DISTINCTIVE **REGISTERS**  
**& GRILLES**  **For Air Conditioning and Gravity**





# The "Sectional Control System"— A Suggested Method for Heating Large Houses

By H. F. Curtis

Engineer, Henry Furnace & Foundry Co.

AIR conditioning engineers and installers have learned through experience that in the larger winter air conditioning installations the problem of uniform temperature maintenance is often difficult.

In the small house, where the system is compact and conditions throughout the house are comparatively uniform, the problem is usually quite simple, but in the larger home a variety of conditions is liable to be encountered. Certain areas tend to lose temperature more rapidly than others. This frequently occurs in the servants' quarters, especially when they are located above the garage.

Then there is the considerable loss in temperature incurred in conveying heated air through trunk lines a comparatively long distance from the unit.

It is obvious that any system controlled by a single thermostat cannot satisfactorily meet all the exposure requirements of the large house. For instance, when outside temperatures are severe, and a high wind velocity prevails, the part of the house

most exposed requires heat far beyond the needs of the less exposed parts of the house. To bring the exposed area to a satisfactory temperature involves overheating other parts of the house; and this condition continues as long as the exposed section loses heat more rapidly than the other sections.

The zone system of distribution was devised to overcome these difficulties but every installer knows that the zone system can give trouble and requires extraordinary care in balancing the system satisfactorily, particularly in the very large house.

Another trouble comes from the excessive amount of heat developed in a large unit under certain conditions. This excess heat must be disposed of, it must go somewhere and may overheat the same area that does not need heat or else it is pushed into a relief zone where the heat is utilized but not actually required.

Another difficulty may be the change in air velocity at warm air registers. If these air veloci-



ties are constantly changing, depending on the number of zones calling for heat, the normal velocities are probably well attained when all the zones are open, but when, say, all zones but one are closed, the air velocity through the one remaining zone will be greatly increased. This tends to create conditions that upset the balance.

There are times in some types of houses, when a zone control system can be distinctly wasteful; for example, when one small section of the house is calling for heat, the whole unit, including blower, must operate to satisfy the rapid heat loss in this area. It is somewhat like employing a heavy freight locomotive to do a light switching job. The unit will unavoidably generate more heat than the area can take. This results in a high stack temperature due to the reduced air volume, the efficiency drops, and fuel cost goes up. Many times the area requiring heat will take only 15% or less of the capacity of the unit.

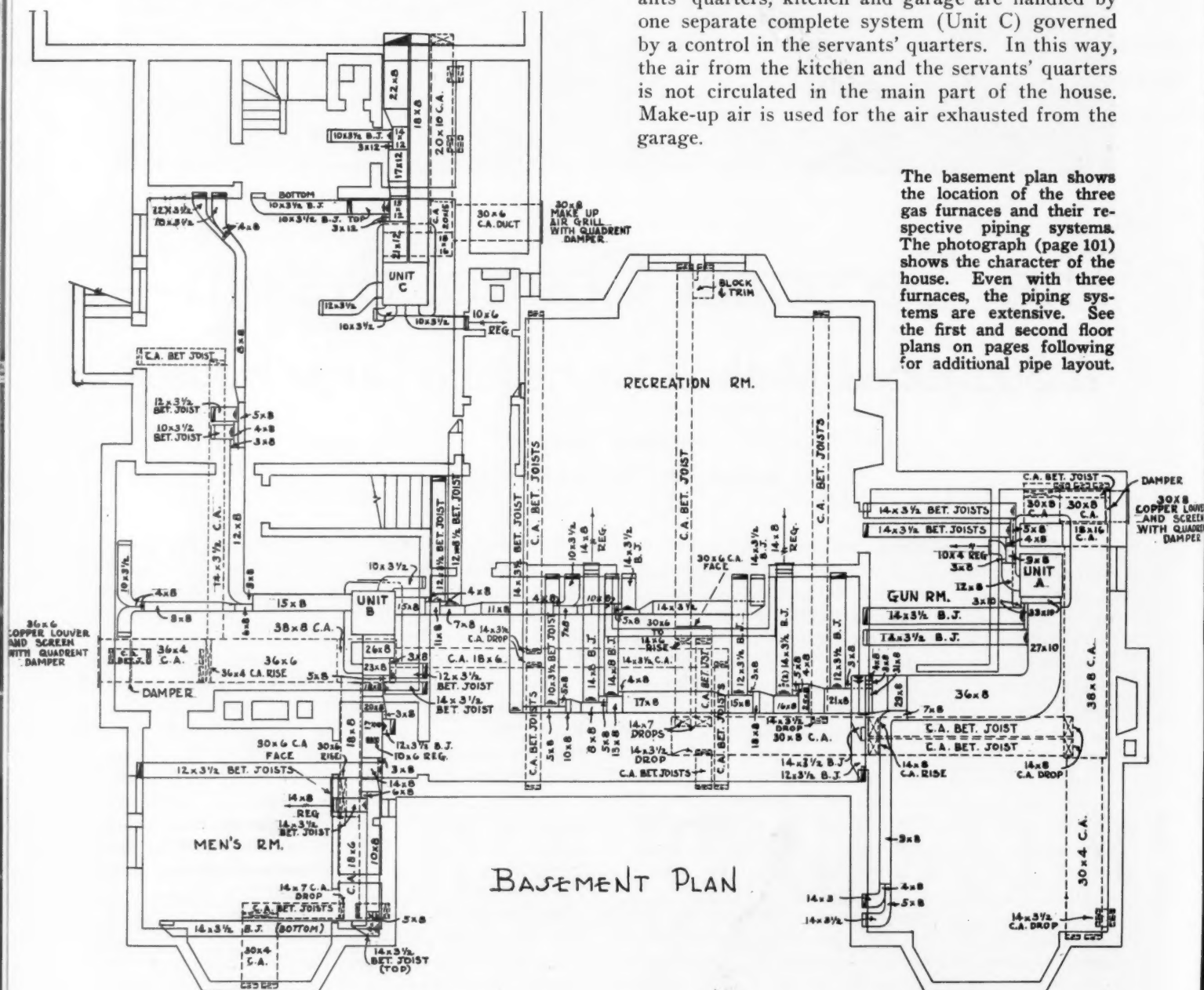
The volume of air moved could be handled easily

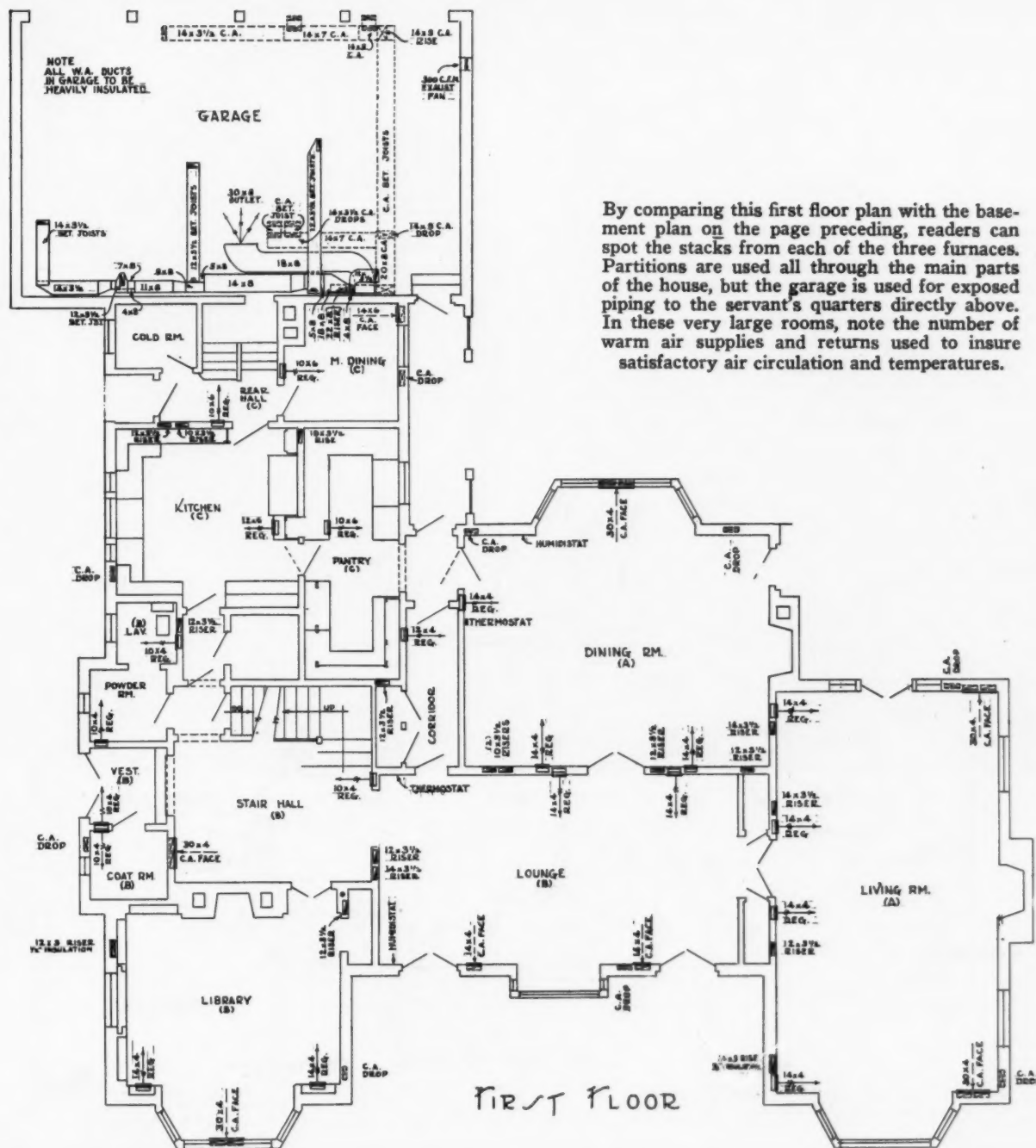
by a 1/6 or 1/4 H. P. blower; but just the same, the one or 1 1/2 H. P. blower will have to keep on running to circulate the smaller volume of air. This means a higher power cost than necessary.

Many contractors have noticed that servants' wings are very often unexcavated and usually at the end of the warm air run. The air has lost some heat when it reaches the wing and can lose much more unless pipes are heavily insulated. Further these wings are first to cool off and last to heat up, which only adds to the problem.

### The Sectional Control System Idea

To overcome these deficiencies, we have devised the "sectional control system." It is well exemplified in the residence shown in the photo and plans, located in Shaker Heights, Cleveland, Ohio (Edward A. Reed, Architect; H. C. Stroachs, Architect's Superintendent; Taylor Obenauer, Sheet Metal Contractor). As the layout shows, the servants' quarters, kitchen and garage are handled by one separate complete system (Unit C) governed by a control in the servants' quarters. In this way, the air from the kitchen and the servants' quarters is not circulated in the main part of the house. Make-up air is used for the air exhausted from the garage.





By comparing this first floor plan with the basement plan on the page preceding, readers can spot the stacks from each of the three furnaces. Partitions are used all through the main parts of the house, but the garage is used for exposed piping to the servant's quarters directly above. In these very large rooms, note the number of warm air supplies and returns used to insure satisfactory air circulation and temperatures.

There is not the slightest difficulty in balancing this section because the unit is so located that long trunk lines are eliminated, and the whole house section forms one compact area with a uniform exposure.

### The Three Zones

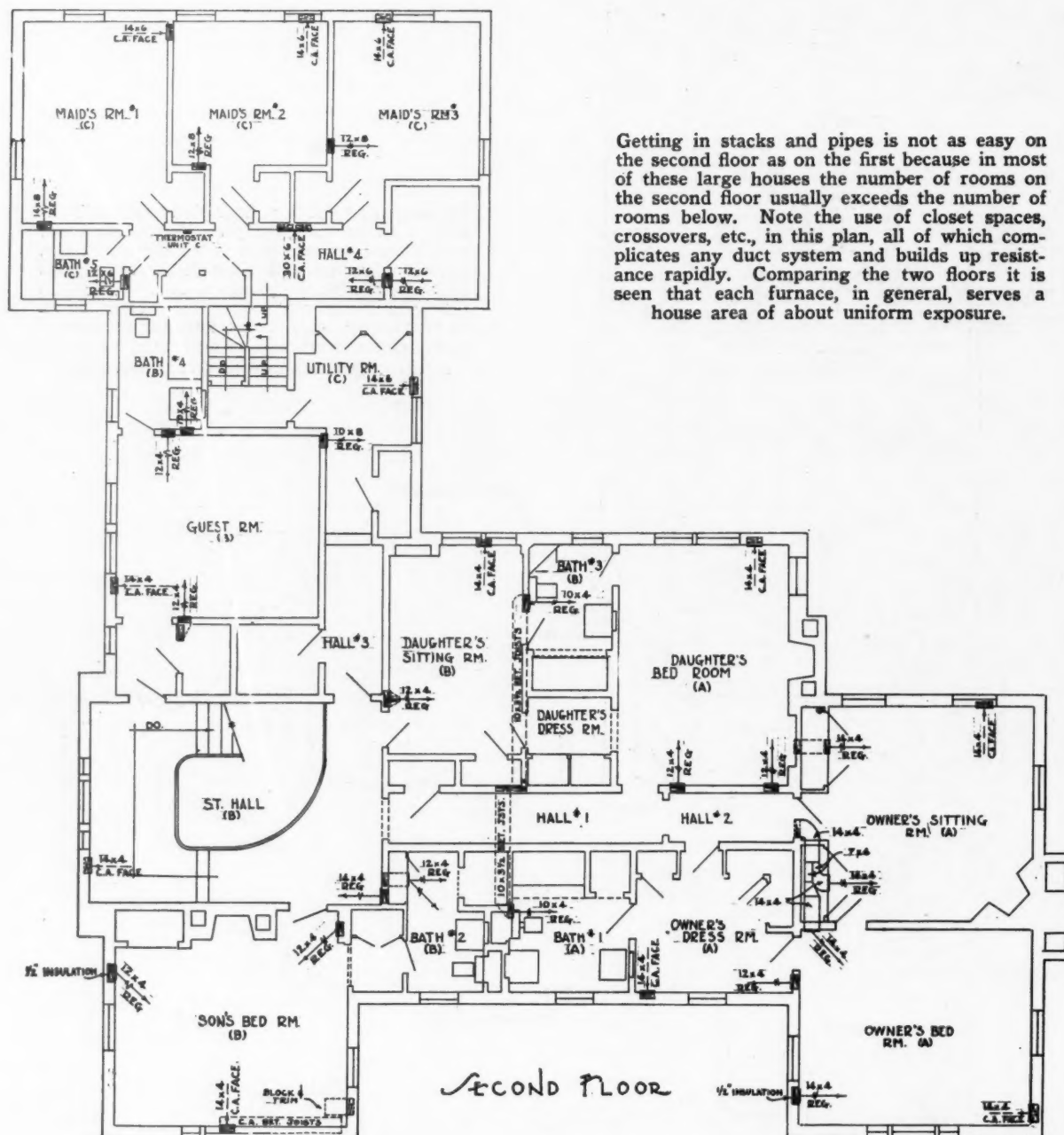
The middle part of the house constitutes another section, a single complete unit (Unit B) with the control in the lounge room. Again the favorable location of the air conditioning unit makes long lines unnecessary. The loss of temperature from duct radiation is at a minimum and no difficulty is experienced in getting the proper balance.

The end of the house opposite from the servants' quarters makes up the third section, heated by Unit A. The thermostat is located in the dining room. The unit here is located so that compara-

tively short ducts are required and this section also is very easily balanced. All three zones comprise rooms on both first and second floors but having similar exposures.

Moncrief gas air conditioners are used in this installation. Gas is employed for fuel because it is most convenient and can be obtained in this area at a favorable price. Similar installations could be made to burn either coal or oil.

In homes covering a smaller ground area, where it is not practical to locate the units within the section of the house served by the unit, it is feasible to place the three air conditioning units in the same furnace room, with one unit providing for the servants' quarters, garage and kitchen, one to serve the downstairs rooms and one the upstairs. This arrangement may require longer trunk lines; but has been found easy to balance and it is not neces-



Getting in stacks and pipes is not as easy on the second floor as on the first because in most of these large houses the number of rooms on the second floor usually exceeds the number of rooms below. Note the use of closet spaces, crossovers, etc., in this plan, all of which complicates any duct system and builds up resistance rapidly. Comparing the two floors it is seen that each furnace, in general, serves a house area of about uniform exposure.

sary that the return air from any one section circulate in other parts of the home.

It is also possible to assemble the separate units under one casing, giving the appearance of one single unit. However, each unit will have its own blower and separate set of controls. The cost of making installations of this kind, including the air conditioners, would be a trifle higher than using a single unit in the zone system; but the advantages are worth considering in some types of houses.

It is an interesting fact that the servants' quarters in these large houses as a rule require heat oftener than other sections of the house because these quarters are so often placed in a wing which runs out from the main house and are exposed on three sides.

A separate unit effects a saving in power required for air circulation as well as in the cost of fuel; for when these quarters require heat the separate unit alone will amply satisfy the requirements. No

excessive amount of heat is radiated from the unit because the blower continues to operate until all the heat is dissipated from the unit. Thus all the heat generated is put to use in the area where it is required and overheating of the room above the unit is eliminated.

The control systems used on these installations are simple, as each section is a duplicate of the controls regularly used in a single small home. Ordinarily all rooms within a zone operate from one thermostat and off of a single trunk line.

These multi-furnace units have had an excellent reception in this area. Architects and owners like the arrangement and accept the argument of economy. In a number of cases the idea has removed complicated ductwork, thus adding usable area in the basement. The idea should be equally applicable where oil is the fuel, but might be complicated in a stoker installation.





WARM AIR FURNACE CONTROL

## "MERCROID"

*IS AN ASSURANCE OF TROUBLE-FREE CONTROL SERVICE  
YOU INSTALL THEM AND FORGET THEM*

When automatic heating or air conditioning equipment is purchased, it is expected to function without interruption. The burden of the responsibility for such performance usually rests with the controls. Inasmuch as the cost of controls is a comparatively small item, it is wise to exercise the utmost discrimination when selecting controls. "Dependableness" and "long life" have become somewhat hackneyed expressions and yet for want of better words, they truly describe Mercoid Controls. These qualifications are really essential factors in controls. As the years come and go, they either prove or disprove the merits of a product. In the case of Mercoid Controls, each year only confirms their reliability over a long period of years. All Mercoid Controls are exclusively equipped with hermetically sealed contact switches. They are not affected by dust, dirt or corrosion.

*THERE IS A MERCROID CONTROL TO MEET YOUR REQUIREMENT. WRITE FOR COMPLETE CATALOG*

THE MERCROID CORPORATION • 4201 BELMONT AVENUE • CHICAGO, ILLINOIS

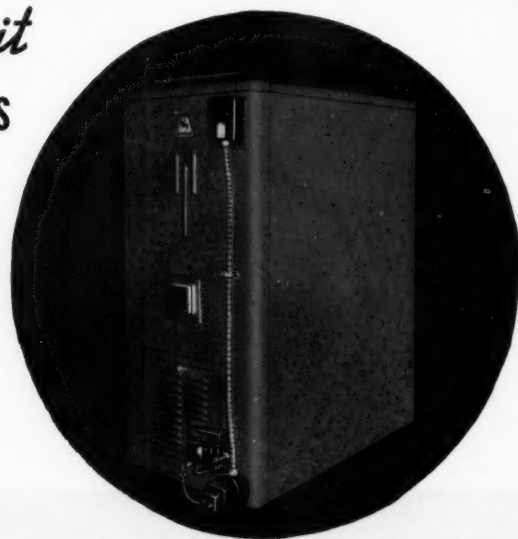


# Lochinvar

## CHALLENGEIRE the NEW Package-Unit by LOCHINVAR for the Lowest Priced Homes

● Here's a package full of the biggest furnace value that has hit the heating trade—Lochinvar's automatic oil-burning air-conditioning Package-Unit—the CHALLENGEIRE with a 59,000 B.T.U. output at bonnet. Because it is only 24" wide, 43" long and 54" high (can pass thru any door), it is shipped completely assembled, and the blower, motor and all controls are mounted and wired—thus, besides your savings in its first cost, there is also a saving for the dealer in the cost of installing and wiring.

Think of it, Mr. Dealer, what a sales talk you can make when you go after the low-priced home market and you have your competitors licked on price, savings, installation cost and service calls! Read these features, then write us for further details and price today.



### Features

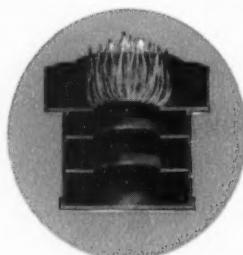


- 1 RADIATOR OR HEAT ECONOMIZER, adding to heating surface and giving maximum amount of efficiency, reducing stack temperature to a minimum.
- 2 ACCESS DOOR to filters, blower and motor.
- 3 FILTERS fire proof. Can easily be removed when necessary.
- 4 BLOWER MOTOR mounted and wired.
- 5 EXTRA LARGE BLOWER, c.f.m. capacity 1,000.
- 6 HEAVY STEEL BASE. Entire furnace is mounted on this base.
- 7 COMBINATION LIMIT AND BLOWER CONTROL mounted and wired.
- 8 COMBUSTION CHAMBER DOOR.
- 9 LOCHINVAR MULTIPLE-STAGE BURNER. No moving parts, nothing to wear out or replace.
- 10 OIL CONTROL AND TRANSFORMER mounted and wired.

Entire furnace with blower, motor and all controls (except the thermostat) is shipped completely assembled and wired ready to install. Not illustrated but part of standard equipment is an automatic humidifier, room thermostat and automatic draft regulator.



No better indication of consumer demand for Lochinvar's furnaces is the fact that they are the largest selling furnaces of their kind on the market today. The reason for Lochinvar's sales leadership is due to its policy of fair dealing with its dealers, by backing every sale they make with a product that has been proven to be of the best construction, and that gives dependable and economical performance at all times. This builds up good will, not only between the Lochinvar Corporation and the dealer, but between the dealer and his customers.



*Multiple-Stage*  
**BURNER**

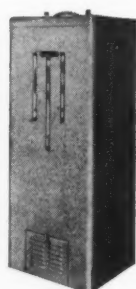
Here is the Economy Champion of all Oil Burners! Built as an integral part of all Lochinvar units is our exclusive Multiple-Stage Burner (patented), LISTED AS STANDARD BY UNDERWRITERS' LABORATORIES to burn No. 1 or No. 2 fuel oil.

The Multiple-Stage Burner has no moving parts, nothing to wear out or cause any service, yet its cleanliness and efficiency are unequaled by the most expensive and complicated oil burner made.

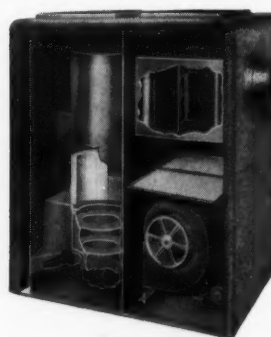
## WRITE FOR LITERATURE ON THIS COMPLETE LINE OF AUTOMATIC OIL-BURNING UNITS



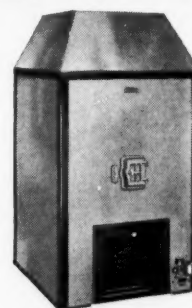
The Model 100A is a complete winter air-conditioning unit with 110,000 B.T.U. output at register with a 1,700 c.f.m. capacity.  
Dimensions—32" wide x 57" high x 69 $\frac{3}{8}$ " deep.



The largest selling automatic oil-burning water heater made. It is beautifully designed in green square casing and is fully automatic.  
Dimensions—23 $\frac{1}{2}$ " wide x 20 $\frac{1}{4}$ " deep x 57 $\frac{1}{2}$ " high.



The Junior-Aire is a complete winter air-conditioning unit with a B.T.U. capacity at the register of 85,000 and c.f.m. capacity of 1,000.  
Dimensions—32" wide x 53" long x 54" high.



The Model 100 is a gravity warm air furnace, ideal for replacement, for its price complete is about the same as an ordinary oil burner alone.  
Dimensions—36" wide x 41" deep x 64" high

# LOCHINVAR CORPORATION

14247 TIREMAN  
DEARBORN, MICH.



# Cooling Control Systems for Residential Installations\*

By G. D. Kingsland  
Minneapolis-Honeywell Co.

**E**FFICIENT operation of cooling equipment depends largely on its control system and, in turn, equipment and control systems for residential equipment must be simple, practical; use few control units, and should be comparatively inexpensive. There are very definite control functions that are necessary and desirable and others that are desirable but not necessarily indispensable. Probably the most important of these functions are the control of dry bulb temperature and the possible reduction of relative humidities. Air circulation and distribution methods require very definite control functions, and there are others absolutely necessary to insure safe and economical operation of the cooling unit itself.

The control equipment may be so arranged that the heating and cooling controls are entirely separate and distinct from each other, or it may be a coordinated control system that will function during either the heating or cooling operation with a few minor circuit readjustments.

## Control of Water Cooling Coils

Cooling by cold water is economical and consequently acceptable to the home owner. Cold water coils have supplanted the cold water spray to a large extent because warmer water can be used, but the control of either is essentially the same.

Cold water systems require a minimum amount of control equipment. Motorized valves are used for controlling the water supply to the coils. When chilled water is used, a 3-way mixing valve may be desirable. Relays may be used to operate in response to pilot circuits to provide increased electrical capacity and make possible a multiplicity of secondary control functions. A low limit remote bulb temperature controller may be used to protect the water from assuming excessively low temperatures.

A two-position motorized valve should be placed in the cold water supply line to operate in response to the demands of the room temperature controller, (Fig. 1), but it should be so arranged that the water supply valve cannot open unless the furnace blower is operating.

## Control of Mechanical Refrigeration

The controls used to regulate the operation of the compressor unit itself may properly be said to be

\*Address before June meeting of National Warm Air Heating and Air Conditioning Ass'n, Milwaukee, June, 1938.

primary controls. A high side and a low side cut-out are usually provided to protect the compressor against excessive pressures on either side. A thermal overload should be built integrally into the motor for protection against excessive motor temperatures, and those larger than one horse power should be provided with a magnetic overload starting switch for control from a pilot circuit and for protection against current overload.

The essential primary controls are a high pressure control, or a combination high and low pressure control, and a temperature controller. If desired, separate high and low pressure controllers may be furnished instead of the combination unit.

Several methods of controlling the operation of the compressor are in general use. One is to control it directly from the room thermostat, and another from

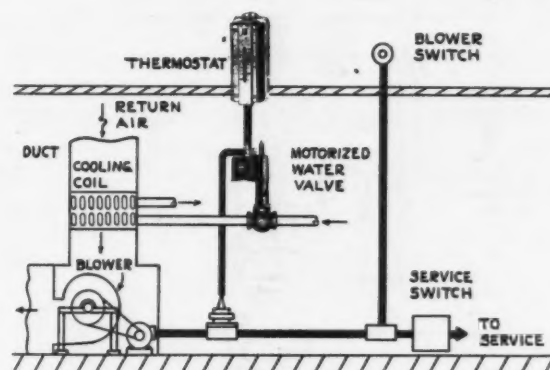


Fig. 1

suction pressure with the thermostat controlling a solenoid valve in the liquid line to the cooling coil. Either method will operate the compressor when cooling is demanded.

When the compressor is controlled directly from air temperatures, the high and low side cut-out switches are normally closed and the temperature controller is the only operative regulating means, (Fig. 2). Should either the high or low side pressures become excessive the compressor stops and remains inoperative until normal pressures are once more restored.

On the other hand, when the temperature controller operates a solenoid valve in the liquid line, the compressor is controlled from suction pressure by the low side pressure control, (Fig. 3). The solenoid valve opens in response to a demand for cooling, and as the



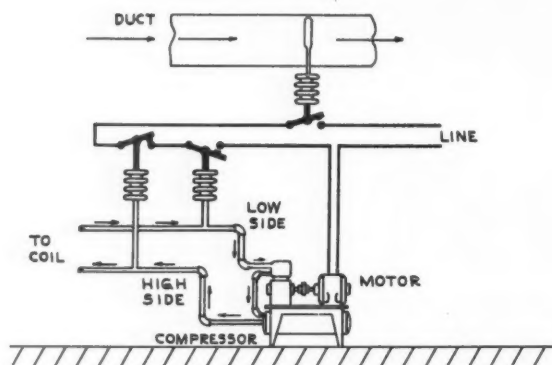


Fig. 2

suction pressure begins to build up, the compressor starts and operates as long as the suction pressure does not again fall too low.

Two-stage cooling, secured either by a two-speed motor on the compressor, or by using two expansion coils, offer advantages that are responsible for its acceptance by engineers. Generally speaking, a two-stage thermostat controls two magnetic starting switches, (Fig. 4), so arranged that the compressor operates on low speed upon the first demand for cooling and at full speed upon a further cooling demand. Two-stage compressor operation should be controlled only from a temperature controller.

When two direct expansion coils are used, they are so arranged that a two-stage thermostat operates a

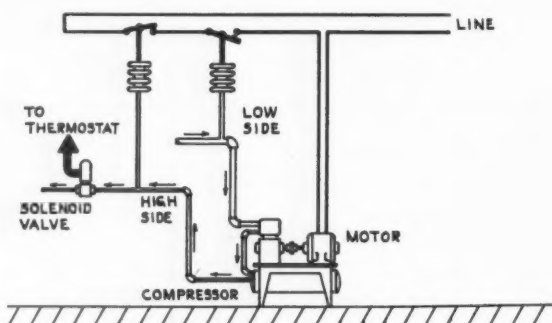


Fig. 3

solenoid valve in the liquid line to the first coil upon the first demand for cooling and the valve to the second coil upon a further demand, (Fig. 5). The compressor operates from suction pressure.

#### Control of Air Circulation

After the necessary control for the cooling means has been determined, it is desirable to determine the necessary control functions that must be provided for the air circulating system, not only as pertains to the circulation of air through the duct system, but through the air conditioning unit itself. Considerable differences of opinion exist among equipment manufacturers concerning location of the cooling coil, the desirability of intermittent or continuous blower operation and whether or not the changes in the air circulating system necessary to transfer from summer to winter operation shall be an entirely automatic operation, or a manual operation, or some step in between.

The control units used are fundamentally the same,

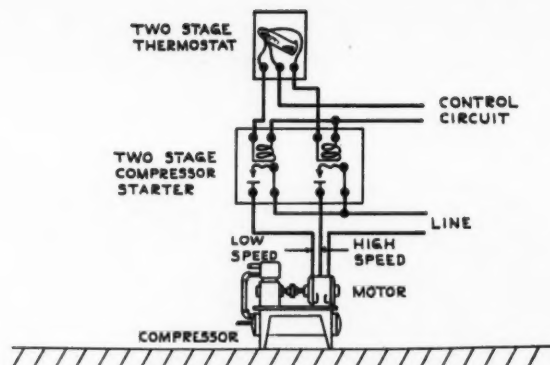


Fig. 4

regardless of the type of operation. When it is necessary to operate dampers,—damper motors are required, of either two-position or modulating type. Duct mounted temperature controllers may be necessary to measure return air temperatures or to act as a low limit control. Relays are required when several control operations are necessary in response to the action of a single thermostat or for use as a translating device between low voltage circuits and line voltage circuits.

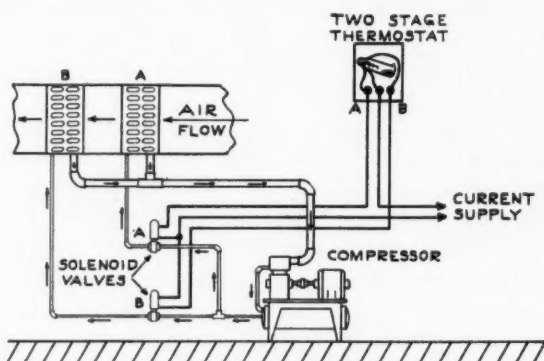


Fig. 5

In analyzing the design of the air circulation system, it will be found that some manufacturers place the cooling coil in the return air duct ahead of the blower, and others place it in the main discharge duct leading from the air conditioning unit to the rooms. A third location places the cooling coil between the blower and the furnace. These seem to be the preferred locations because of reduced space requirements and lower costs.

Increased resistance in the duct system can be

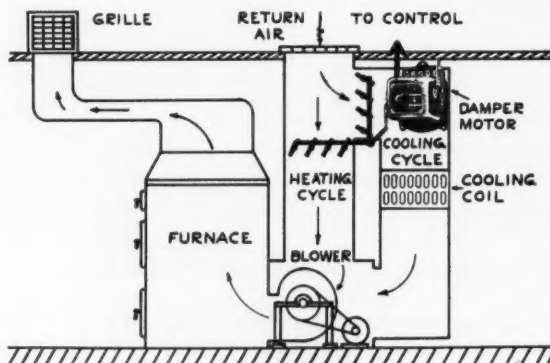


Fig. 6

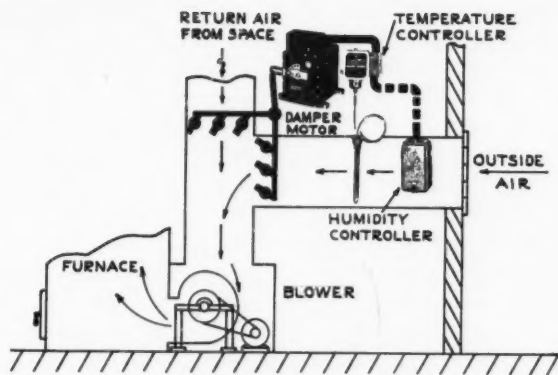


Fig. 7

avoided by placing the coil in a by-pass duct with dampers arranged to direct the air through the coils or around them, (Fig. 6). The dampers may be operated manually or electrically to reposition them for the summer or winter cycle. Manual operation is preferred from an economic standpoint, but when an automatic changeover from the heating to the cooling cycle is desirable, motorized dampers, controlled from a suitable changeover switch, are indispensable. Motorized operation is particularly convenient when climatic conditions are such that both heating and cooling are required during a 24-hour period.

The use of outside air, particularly night air, will reduce the load on the cooling equipment and introduce some very desirable operating economics. This will require an outside air duct leading into the return air system and a set of manual or motorized dampers, (Fig. 7 without humidity controller or outside air temperature controller).

The amount of outside air used should be regulated by outside temperature and humidity conditions. The automatic adjustment of the dampers, by an outside temperature controller, will permit the use of the correct amount of outside air for the most satisfactory and economical operation possible, (Fig. 7). The addition of a humidity controller will keep the dampers in the closed position when outdoor humidities are excessively high.

#### Zoned Cooling Systems

Zoned air conditioning systems fall in two classifications. The first is one zoned according to occupancy

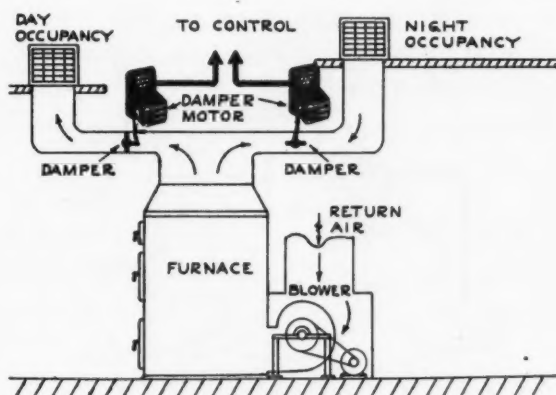


Fig. 8

to materially reduce the required cooling capacity. The ducts to the rooms normally occupied in the day time are segregated from those leading to rooms normally occupied at night, and dampers so regulate the distribution of the air that only those rooms occupied are cooled. Obviously, the dampers may be either manually or electrically operated.

Transferring from one cooling zone to the other is

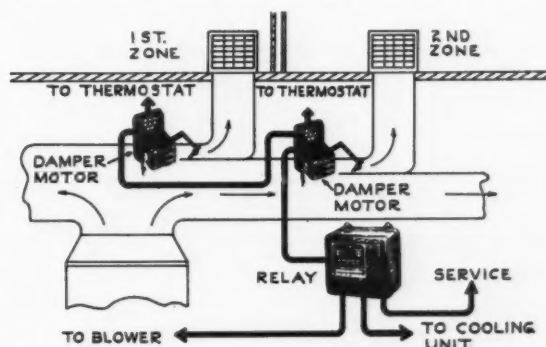


Fig. 9

necessary at least twice a day—morning and evening—and consequently, manual operation of the dampers is inconvenient. Motorized dampers, (Fig. 8), controlled from upstairs, should be used for the sake of convenience, if for no other reason. Simultaneously with the change in damper position, the circuit to the controlling thermostat must also be changed so that the thermostat in the operating zone is in command. During the heating cycle, both the dampers should be in the open position and thermostat in the general living quarters of the house should be in control.

The other zone system is zoned primarily for heating, and through which cooling is supplied during the cooling cycle. The zone thermostats should be arranged so that during the cooling cycle the duct dampers will open in response to a rise in space temperatures instead of closing, as in the heating cycle, (Fig. 9). This can be done by a reversing switch in the thermostat wiring. Normally each zone operates indepen-

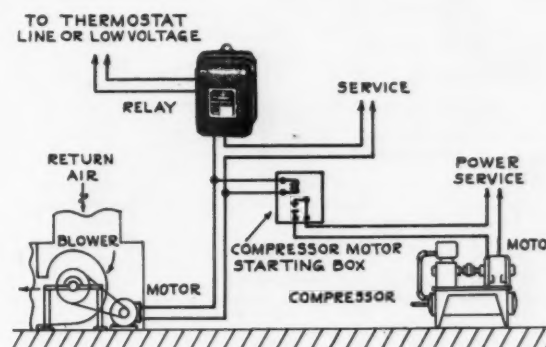


Fig. 10

dently of the others, but summer-winter transfer switches can make certain groups of zones operative for the day period, and others for the night, thus providing zone operation according to occupancy during the cooling cycle and normal zone operation during the heating cycle.

Blower operation may be either intermittent or con-

tinuous. There is a division of opinion as to which type of operation is preferred and the control system must be designed for either condition. A switch can be provided, if necessary, so that either type of operation can be secured.

Intermittent blower operation requires a thermostatically controlled relay, that will close the circuit to both

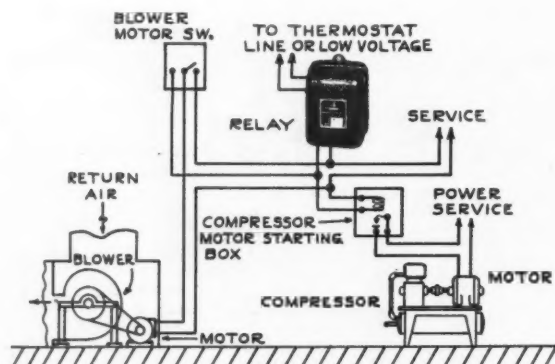


Fig. 11

blower and compressor upon a demand for cooling, (Fig. 10).

Continuous fan operation on the other hand, requires a thermostatically controlled relay that will close the circuit to the compressor only, the circuit being so arranged that the compressor cannot operate unless the blower is in operation, (Fig. 11). The blower circuit is energized by closing a switch that not only starts the blower, but energizes the control circuit, too, and permits the compressor to operate when required.

#### Controls in the Space Cooled

The controls used in the rooms are really the master controls of the air conditioning system; hence, it is

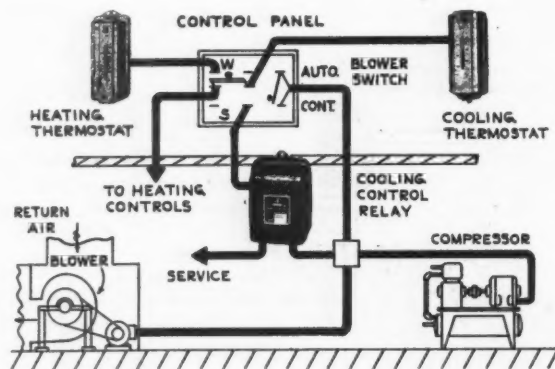


Fig. 12

necessary to know the functional requisites of the complete system. The type of blower operation—a continuous or intermittent—should be determined and whether the blower will be controlled by bonnet or room temperatures during the heating cycle. Then it is desirable to know if one co-ordinated control system, or distinctly separate systems will control the summer and winter operations. The duct layout and zoning, if

used, has an influence on the control system and may require special arrangements.

The space controls normally used are comparatively few. A room thermostat, to measure room temperatures, or a duct type thermostat to measure return air temperatures, is always used, and these are generally two-position instruments, although a modulating instrument can be used at times to advantage. Humidity controllers are also necessary at times.

A control panel must be provided for the necessary summer-winter change-over operation. While it may be a simple switching panel, the trend seems to give preference to one that is attractively finished and made readily accessible by mounting it in the living quarters of the home. It should be equipped with the summer-winter change-over switches; and the other necessary change-over equipment. While their use simplifies the change-over from summer to winter operation, the ad-

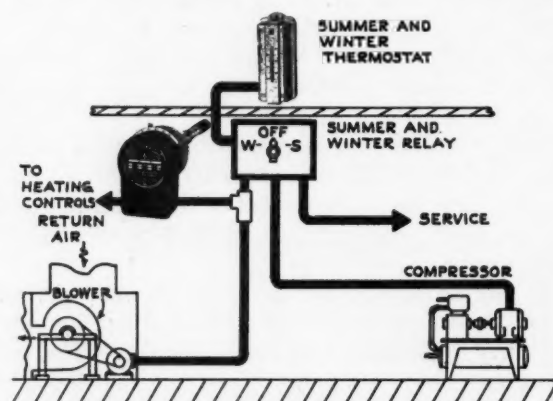


Fig. 13

vantage is, in a measure, offset by the fact that other changes, not so readily made, may be necessary in the air conditioning system itself. Rather elaborate panels seem to be preferred, with such refinements as indicating lights to tell the home owner what the air conditioning system is doing. These accoutrements add to the cost, but apparently they have a most definite sales appeal.

It is seldom that the heating and cooling control systems are entirely separated. On an all year system, with the blower controlled from bonnet temperatures during the heating cycle, separate heating and cooling

(Continued on page 146)

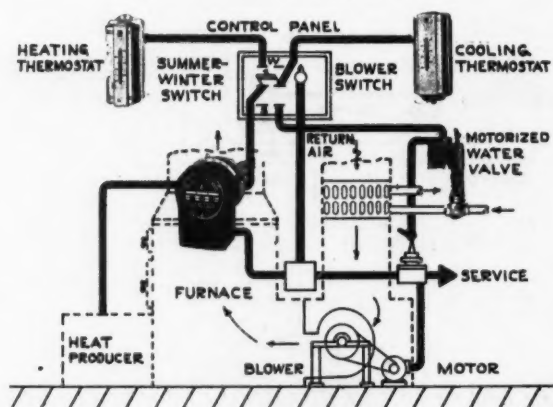


Fig. 14





#### **Waterbury Seamless**

*Welded permanently gas and dust proof, we consider this the best hand-fired system we have ever built.*



#### **Waterbury Gastite**

*An efficient heating unit, made to sell at a low price—but still a quality unit.*

#### **Waterbury Comfortrol**

*Waterbury has developed this tested and proved unit to bring all the convenience, economy and health advantages of automatic conditioned-air heating within the cost limitations of average homes.*

### **WATERBURY**



### **COMFORTROL**

*For Oil or Gas*

## **For Any Type of Fuel . . .**

**GAS • OIL • COAL • COKE • STOKER**

Whatever the home owner's choice of fuel may be there is a Waterbury that burns it. Beside the models shown here, there is the Seamless Stoker Air Conditioner, the Seamless Oil Burning Air Conditioner, The Comfortrol Stoker Air Conditioner and two types of gas burning Comfortrol Air Conditioners.

### **A Waterbury for Every Type of Customer**

Regardless of size or type of home, of financial position, of fuel preference, there is a Waterbury for every customer.

**Write today for dealer catalog giving full information.**

**THE WATERMAN-WATERBURY COMPANY**

122 Jackson St. N. E. • Minneapolis, Minnesota

# Waterbury—

## **The Complete Line OF**

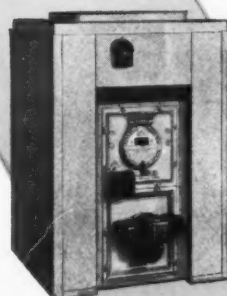
## **Warm Air Heating Systems**

No matter what your customers want, from a hand-fired gravity job up to the last word in modern winter air conditioners, you can satisfy them from the Waterbury line.

Waterbury can supply heating systems for large or small homes, fat or lean purses, in models ranging from unadorned utility to beauty combined with highest efficiency.

#### **Waterbury Comfortrol**

*The unit at the left, will bring modern winter air conditioning to any average size home at a very nominal cost. It is a complete unit in one package. Summer cooling may be added.*



#### **Seamless Oil Burning Furnace**

*This unit is built for oil burning. Economy and efficiency are the direct results.*

#### **Comfortrol**

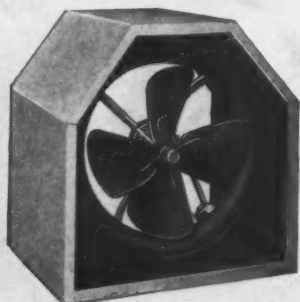
*The last word in winter air conditioning. Handles big jobs easily.*





#### STOKOLAIR BLOWER-FILTER UNITS

This is the finest and most complete blower-filter unit available. Standardized so that one size fits nearly all furnaces. Equipped with Air-Maze permanent filter...



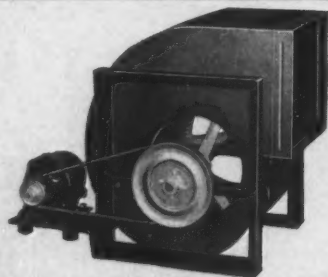
#### HOME VENTILATORS

Hy-Duty Home Ventilators can be had in both propeller and blower types... with air deliveries up to 16,000 C. F. M. Priced so you can compete for business in the popular priced field. Sturdily built... exclusive features... handsomely designed.



#### STOKOLAIR HUMIDIFIER

A reliable, practical unit combining humidity control, forced warm air circulation and filtered air. A unique dual system of control eliminates possibility of excess condensation.



#### HY-DUTY BLOWERS

Sizes from 10" to 25" in diameter—with or without motors—combinations consist of top horizontal, bottom horizontal, top vertical and bottom vertical discharge opening. Soundly engineered... built to Schwitzer-Cummins precision standards.

# *The Swing is to* **FORCED WARM AIR HEATING**

● There is a HY-DUTY blower for every heating job up to 15,000 C.F.M. . . . available in top horizontal, bottom horizontal, top vertical and bottom vertical discharge outlets.

HY-DUTY blowers are superior at every point . . . performance, quality, engineering, selling features, price.

For 20 years Schwitzer-Cummins Company has been suppliers of air handling equipment to over 350 leading builders of engineering products whose specifications permit only the best. This is your assurance that whenever you recommend or buy HY-DUTY Conditioners, you have put your O.K. on the best there is in performance, reliability and simple, economical operation.

The HY-DUTY line embraces blowers for every purpose; for general ventilation, blower filter units, blower filter-humidifiers combined, attic ventilators. It will pay you well to investigate the HY-DUTY line. It will permit you to buy all your blower requirements from one old established source.

*Descriptive literature and prices will be cheerfully sent on request.*



A full range of Hy-Duty blower wheels and Hy-Duty pillow blocks offered as separate equipment. Center disc double inlet type wheels from 4½ inches in diameter to 25 inches in diameter.

*It's the Best BLOWER-FILTER UNIT  
IN THE COMPETITIVE FIELD . . . Anywhere at Any Price!*

MANUFACTURED BY THE BLOWER DIVISION OF  
**SCHWITZER-CUMMINS COMPANY**  
LOCATED AT FAN STREET . . . INDIANAPOLIS, U.S.A.

## *Weights of Galvanized Iron*

### *and Labor Time Required for*

# Fabricating Common Duct Sections

SOMEWHERE in the process of converting any given set of engineering plans into a finished and operating winter air conditioning system, the contractor must face the problem of estimating the weight of galvanized iron and the amount of labor required to fabricate the duct work ready for hanging. This fabricating cost, added to the cost of labor required for erection, represents the net cost of the metal work to which must be added overhead and all other expenses, and profit, to arrive at the selling price of the metal work connected with the installation.

No matter what method the contractor uses to estimate his fabricating labor cost, he must base his judgment upon his knowledge of the ability of his mechanics and upon past experience with the required items. The thorough operator will, of course, keep records of cost figures of each common item so that when this item comes up again he has only to turn to this record to find how much metal and how much time is needed.

If the contractor carries this method still further, it naturally comes about that he tends more and more to standardize his items, avoiding new and unfamiliar items, because he knows that the mechanics can do the familiar work more quickly and more cheaply. Also, any unfamiliar item slows up the whole process as the men stop to study, work out, and tinker with ideas and suggestions.

#### Time and Weight Experiments

Few shops have ever had occasion to work out complete cost records for all the common fittings and sizes of ducts used in residential air conditioning, but E. B. Root, Manager, Heating Department of the Nelson Company, Detroit, did have this occasion a few years ago. At that time his firm was fabricating from the blue print complete duct systems, ready to hang, built to the inch and assembled upon the ground plan of the house chalked out on the floor of the shop. The number of such jobs and their variety eventually covered all duct depths from 7 inches to 12 inches and all widths from 4

inches to 44 inches. The weight of material required and the time needed to fabricate were carefully kept. Revisions were made from time to time as weight and time saving ideas were developed so that eventually there issued a complete set of weight and time records for all common sections.

When finally developed, these records were tabulated and grouped so that from the blue print of the job the total weight of iron and the time needed to fabricate could be listed item by item for the complete job.

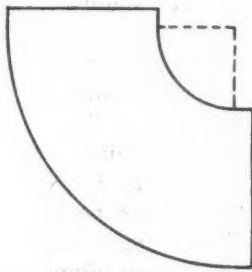
We present here the first of a series of charts showing these records. The charts are self-explanatory, all that is required is to pick the fitting or section by size in the tables and read off the time and material weight.

#### Possible Cost Reductions

Mr. Root says: "I wish to call attention to the 'time required' items for the various sections. It would be possible to build these sections in less time than shown if it were not for the fact that the time required on these sheets allows for building the entire system to field measurements. If it were possible to build up a stock of the fittings, such could be done in less time, but the sheets assume that each job calls for a complete fabrication. The time required will depend, to some extent, of course, on the equipment used and the skill of the mechanics. The time shown is plotted for 'good' mechanics who waste no time figuring things out, but proceed at once to cutting, forming and assembling the item. The contractor can take these figures and check his own men against typical fittings to set up a comparison percentage for his own mechanics. This percentage might be applied against the entire job or could be used to build up a corrected tabulation based upon a particular shop and set of mechanics."

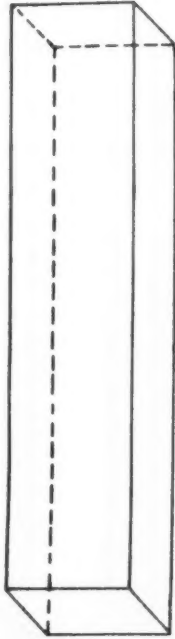
The complete set of charts cover all common fittings and all depths of ducts from 7 inches to 12 inches. Succeeding issues will contain additional charts so that the complete set will be available.





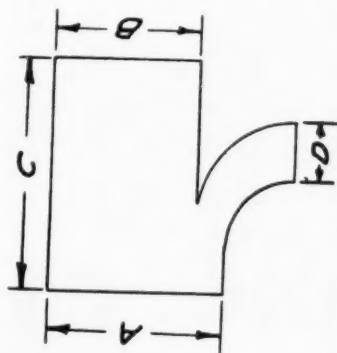
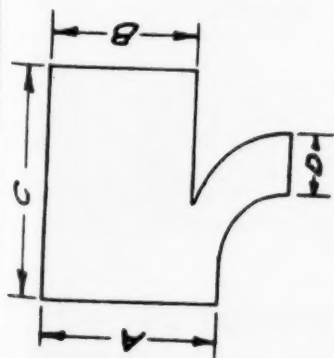
WEIGHT AND TIME FOR RECTANGULAR ELBOWS CUT A

| DUCT | WIDTH | GAUGE | 7"     |      | 8"     |      | 9"     |      | 10"    |      | 12"    |      |
|------|-------|-------|--------|------|--------|------|--------|------|--------|------|--------|------|
|      |       |       | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME |
| 44   | 24    | 24    | 86.8   | 150' | 87.9   | 150' | 89.1   | 150' | 90.3   | 150' | 92.6   | 150' |
| 42   | 24    | 24    | 79.9   | 140' | 81.1   | 140' | 82.2   | 140' | 83.3   | 140' | 85.5   | 140' |
| 40   | 24    | 24    | 73.2   | 130' | 74.2   | 130' | 75.3   | 130' | 76.4   | 130' | 78.5   | 130' |
| 38   | 24    | 24    | 66.8   | 120' | 67.8   | 120' | 68.9   | 120' | 69.9   | 120' | 71.9   | 120' |
| 36   | 24    | 24    | 60.8   | 110' | 61.8   | 110' | 62.7   | 110' | 63.7   | 110' | 65.6   | 110' |
| 34   | 24    | 24    | 54.9   | 105' | 55.9   | 105' | 56.8   | 105' | 57.6   | 105' | 59.4   | 105' |
| 32   | 26    | 26    | 38.9   | 100' | 39.5   | 100' | 40.2   | 100' | 40.8   | 100' | 42.2   | 100' |
| 30   | 26    | 26    | 34.7   | 95'  | 35.3   | 95'  | 35.9   | 95'  | 36.5   | 95'  | 37.8   | 95'  |
| 28   | 26    | 26    | 30.8   | 90'  | 31.4   | 90'  | 32.0   | 90'  | 32.6   | 90'  | 33.8   | 90'  |
| 26   | 26    | 26    | 27.2   | 60'  | 27.7   | 60'  | 28.3   | 60'  | 28.8   | 60'  | 29.9   | 60'  |
| 24   | 26    | 26    | 23.7   | 60'  | 24.2   | 60'  | 24.7   | 60'  | 25.2   | 60'  | 26.3   | 60'  |
| 22   | 26    | 26    | 20.6   | 55'  | 21.0   | 55'  | 21.5   | 55'  | 22.0   | 55'  | 22.9   | 55'  |
| 20   | 26    | 26    | 17.6   | 55'  | 18.0   | 55'  | 18.5   | 55'  | 18.9   | 55'  | 19.8   | 55'  |
| 18   | 26    | 26    | 14.8   | 50'  | 15.2   | 50'  | 15.6   | 50'  | 16.0   | 50'  | 16.8   | 50'  |
| 16   | 26    | 26    | 12.4   | 50'  | 12.7   | 50'  | 13.1   | 50'  | 13.5   | 50'  | 14.2   | 50'  |
| 14   | 26    | 26    | 10.1   | 45'  | 10.4   | 45'  | 10.7   | 45'  | 11.0   | 45'  | 11.7   | 45'  |
| 12   | 26    | 26    | 8.0    | 45'  | 8.3    | 45'  | 8.6    | 45'  | 8.9    | 45'  | 9.4    | 45'  |
| 10   | 26    | 26    | 6.2    | 40'  | 6.4    | 40'  | 6.7    | 40'  | 6.9    | 40'  | 7.4    | 40'  |
| 9    | 26    | 26    | 5.5    | 40'  | 5.7    | 40'  | 5.9    | 40'  | 6.1    | 40'  | 6.5    | 40'  |
| 8    | 26    | 26    | 4.6    | 35'  | 4.8    | 35'  | 5.0    | 35'  | 5.2    | 35'  | 5.6    | 35'  |
| 7    | 26    | 26    | 3.9    | 35'  | 4.1    | 35'  | 4.2    | 35'  | 4.4    | 35'  | 4.8    | 35'  |
| 6    | 26    | 26    | 3.2    | 30'  | 3.4    | 30'  | 3.5    | 30'  | 3.7    | 30'  | 4.0    | 30'  |
| 5    | 26    | 26    | 2.7    | 30'  | 2.8    | 30'  | 2.9    | 30'  | 3.1    | 30'  | 3.3    | 30'  |
| 4    | 26    | 26    | 2.1    | 30'  | 2.2    | 30'  | 2.3    | 30'  | 2.4    | 30'  | 2.7    | 30'  |



WEIGHT AND TIME FOR RECTANGULAR DUCTS PER JOINT

| Width | DEPTH |     | 1'   |      | 2'   |      | 3'   |      | 4'   |      | 5'   |      | 6'   |      | 7'   |      | 8'   |      |
|-------|-------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|       |       |     | Wt.  | Time | Wt.  | Time | Wt.  | Time | Wt.  | Time | Wt.  | Time | Wt.  | Time | Wt.  | Time | Wt.  | Time |
| 44    | 10.6  | 30' | 21.2 | 30'  | 31.8 | 30'  | 42.4 | 30'  | 32.5 | 30'  | 43.0 | 30'  | 52.0 | 30'  | 45.5 | 30'  | 52.0 | 30'  |
| 42    | 10.2  | 30' | 20.4 | 30'  | 30.6 | 30'  | 40.8 | 30'  | 31.0 | 30'  | 41.3 | 30'  | 49.6 | 30'  | 43.4 | 30'  | 49.6 | 30'  |
| 40    | 9.8   | 30' | 19.6 | 30'  | 29.5 | 30'  | 39.3 | 30'  | 29.5 | 30'  | 39.2 | 30'  | 44.8 | 30'  | 39.2 | 30'  | 44.8 | 30'  |
| 38    | 9.4   | 30' | 18.9 | 30'  | 28.3 | 30'  | 37.8 | 30'  | 28.0 | 30'  | 37.1 | 30'  | 42.4 | 30'  | 37.1 | 30'  | 42.4 | 30'  |
| 36    | 9.1   | 30' | 18.1 | 30'  | 27.2 | 30'  | 36.2 | 30'  | 26.5 | 30'  | 35.4 | 30'  | 41.3 | 30'  | 35.4 | 30'  | 41.3 | 30'  |
| 34    | 8.7   | 30' | 17.3 | 30'  | 26.0 | 30'  | 34.7 | 30'  | 25.0 | 30'  | 33.6 | 30'  | 39.2 | 30'  | 33.6 | 30'  | 39.2 | 30'  |
| 32    | 6.5   | 30' | 13.0 | 30'  | 19.5 | 30'  | 26.0 | 30'  | 20.0 | 30'  | 26.5 | 30'  | 31.8 | 30'  | 26.5 | 30'  | 31.8 | 30'  |
| 30    | 6.2   | 30' | 12.4 | 30'  | 18.6 | 30'  | 24.8 | 30'  | 18.8 | 30'  | 23.5 | 30'  | 28.2 | 30'  | 18.8 | 30'  | 23.5 | 30'  |
| 28    | 5.9   | 30' | 11.8 | 30'  | 17.7 | 30'  | 23.6 | 30'  | 17.6 | 30'  | 22.0 | 30'  | 26.4 | 30'  | 17.6 | 30'  | 22.0 | 30'  |
| 26    | 5.6   | 30' | 11.2 | 30'  | 16.8 | 30'  | 22.4 | 30'  | 16.4 | 30'  | 20.5 | 30'  | 24.6 | 30'  | 16.4 | 30'  | 20.5 | 30'  |
| 24    | 5.3   | 30' | 10.6 | 30'  | 15.9 | 30'  | 21.2 | 30'  | 15.2 | 30'  | 19.0 | 30'  | 22.8 | 30'  | 15.2 | 30'  | 19.0 | 30'  |
| 22    | 5.0   | 30' | 10.0 | 30'  | 15.0 | 30'  | 20.0 | 30'  | 14.0 | 30'  | 17.5 | 30'  | 21.0 | 30'  | 14.0 | 30'  | 17.5 | 30'  |
| 20    | 4.7   | 30' | 9.4  | 30'  | 14.1 | 30'  | 18.8 | 30'  | 13.2 | 30'  | 16.0 | 30'  | 19.2 | 30'  | 13.2 | 30'  | 16.0 | 30'  |
| 18    | 4.4   | 30' | 8.8  | 30'  | 13.2 | 30'  | 17.6 | 30'  | 12.3 | 30'  | 15.2 | 30'  | 18.3 | 30'  | 12.3 | 30'  | 15.2 | 30'  |
| 16    | 4.1   | 30' | 8.2  | 30'  | 12.3 | 30'  | 16.4 | 30'  | 11.4 | 30'  | 14.0 | 30'  | 17.4 | 30'  | 11.4 | 30'  | 14.0 | 30'  |
| 14    | 3.8   | 30' | 7.6  | 30'  | 11.4 | 30'  | 15.2 | 30'  | 10.5 | 30'  | 13.8 | 30'  | 16.5 | 30'  | 10.5 | 30'  | 13.8 | 30'  |
| 12    | 3.5   | 30' | 7.0  | 30'  | 10.5 | 30'  | 14.0 | 30'  | 9.6  | 30'  | 12.6 | 30'  | 15.3 | 30'  | 9.6  | 30'  | 12.6 | 30'  |
| 10    | 3.2   | 30' | 6.4  | 30'  | 9.6  | 30'  | 12.6 | 30'  | 8.7  | 20'  | 11.4 | 30'  | 14.5 | 30'  | 8.7  | 20'  | 11.4 | 30'  |
| 9     | 3.1   | 20' | 6.1  | 20'  | 9.2  | 20'  | 12.0 | 30'  | 8.3  | 20'  | 10.9 | 25'  | 13.8 | 30'  | 8.3  | 20'  | 10.9 | 25'  |
| 8     | 2.9   | 20' | 5.8  | 20'  | 8.7  | 20'  | 11.4 | 30'  | 7.8  | 20'  | 10.3 | 25'  | 13.0 | 30'  | 7.8  | 20'  | 10.3 | 25'  |
| 7     | 2.8   | 20' | 5.5  | 20'  | 8.3  | 20'  | 10.9 | 25'  | 7.4  | 20'  | 9.7  | 25'  | 12.3 | 25'  | 7.4  | 20'  | 9.7  | 25'  |
| 6     | 2.6   | 20' | 5.2  | 20'  | 7.8  | 20'  | 10.3 | 25'  | 6.9  | 20'  | 9.2  | 25'  | 11.5 | 25'  | 6.9  | 20'  | 9.2  | 25'  |
| 5     | 2.5   | 20' | 4.9  | 20'  | 7.4  | 20'  | 9.7  | 25'  | 6.5  | 20'  | 8.8  | 25'  | 10.8 | 25'  | 6.5  | 20'  | 8.8  | 25'  |
| 4     | 2.3   | 20' | 4.6  | 20'  | 6.9  | 20'  | 9.2  | 25'  | 6.1  | 20'  | 8.2  | 25'  | 10.1 | 25'  | 6.1  | 20'  | 8.2  | 25'  |



REDUCING JOINT WITH ONE BRANCH

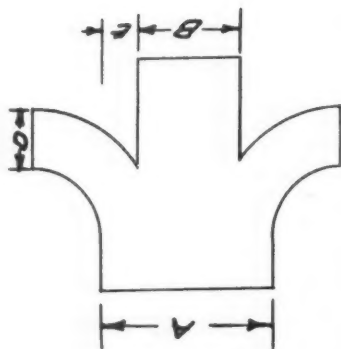
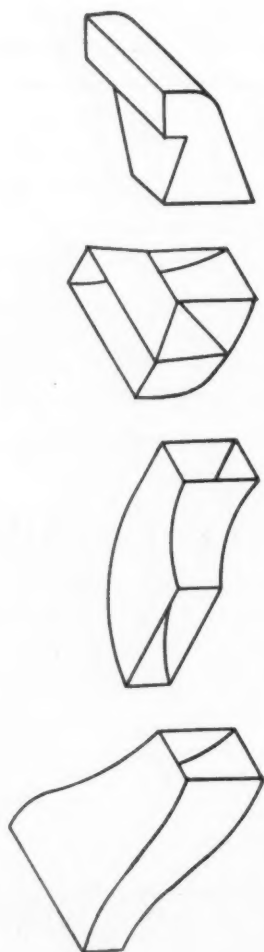
DEPTH OF DUCT 8"

| C    | 27"    |       | 24"    |       | 21"    |      | 18"    |      | 17"                        |                            |
|------|--------|-------|--------|-------|--------|------|--------|------|----------------------------|----------------------------|
|      | D A-B  |       | D A-B  |       | D A-B  |      | D A-B  |      | D A-B D A-B                |                            |
|      | 16x8   | (12") | 14x8   | (10") | 12x8   | (8") | 10x8   | (7") | 9x8-6"<br>8x8-5"<br>7x8-4" | 6x8-4"<br>5x8-3"<br>4x8-2" |
| A    | WEIGHT | TIME  | WEIGHT | TIME  | WEIGHT | TIME | WEIGHT | TIME | WEIGHT                     | TIME                       |
| 44x8 | 30.8   | 90'   | 26.8   | 90'   | 23.1   | 90'  | 19.6   | 90'  | 18.0                       | 90'                        |
| 42x8 | 29.8   | 90'   | 26.0   | 90'   | 22.4   | 90'  | 19.0   | 90'  | 17.5                       | 90'                        |
| 40x8 | 29.0   | 90'   | 25.2   | 90'   | 21.7   | 90'  | 18.4   | 90'  | 16.9                       | 90'                        |
| 38x8 | 28.1   | 90'   | 24.4   | 90'   | 21.0   | 90'  | 17.8   | 90'  | 16.3                       | 90'                        |
| 36x8 | 27.2   | 90'   | 23.7   | 90'   | 20.3   | 90'  | 17.2   | 90'  | 15.8                       | 90'                        |
| 34x8 | 26.4   | 75'   | 22.9   | 75'   | 19.6   | 75'  | 16.7   | 75'  | 15.4                       | 75'                        |
| 32x8 | 20.0   | 75'   | 17.4   | 75'   | 14.9   | 75'  | 12.6   | 75'  | 11.6                       | 75'                        |
| 30x8 | 19.3   | 60'   | 16.8   | 60'   | 14.4   | 60'  | 12.1   | 60'  | 11.2                       | 60'                        |
| 28x8 | 18.6   | 60'   | 16.2   | 60'   | 13.9   | 60'  | 11.7   | 60'  | 10.7                       | 60'                        |
| 26x8 | 18.0   | 60'   | 15.6   | 60'   | 13.3   | 60'  | 11.3   | 60'  | 10.2                       | 60'                        |
| 24x8 | 17.3   | 45'   | 15.0   | 45'   | 12.8   | 45'  | 10.8   | 45'  | 9.8                        | 45'                        |
| 22x8 | 16.6   | 45'   | 14.4   | 45'   | 12.3   | 45'  | 10.4   | 45'  | 9.4                        | 45'                        |
| 20x8 | 16.0   | 45'   | 13.8   | 45'   | 11.8   | 45'  | 10.0   | 45'  | 9.0                        | 45'                        |
| 18x8 | 15.3   | 45'   | 13.2   | 45'   | 11.3   | 45'  | 9.5    | 45'  | 8.5                        | 45'                        |
| 16x8 |        |       | 12.5   | 45'   | 10.7   | 45'  | 9.0    | 45'  | 8.1                        | 45'                        |
| 14x8 |        |       |        |       | 10.1   | 45'  | 8.5    | 45'  | 7.7                        | 45'                        |
| 12x8 |        |       |        |       |        |      | 8.1    | 30'  | 7.3                        | 30'                        |
| 10x8 |        |       |        |       |        |      |        |      | 6.8                        | 30'                        |
| 9x8  |        |       |        |       |        |      |        |      | 6.3                        | 30'                        |
| 8x8  |        |       |        |       |        |      |        |      | 5.8                        | 30'                        |
| 7x8  |        |       |        |       |        |      |        |      | 5.6                        | 30'                        |
| 6x8  |        |       |        |       |        |      |        |      | 5.5                        | 30'                        |

REDUCING JOINT WITH ONE BRANCH

DEPTH OF DUCT 9"

| C    | 27"    |       | 24"    |      | 21"    |      | 18"    |      | 17"                        |                  |
|------|--------|-------|--------|------|--------|------|--------|------|----------------------------|------------------|
|      | D A-B  |       | D A-B  |      | D A-B  |      | D A-B  |      | D A-B D A-B                |                  |
|      | 14x9   | (10") | 12x9   | (9") | 10x9   | (7") | 9x9    | (6") | 8x9-5"<br>7x9-4"<br>4x9-2" | 5x9-3"<br>4x9-2" |
| A    | WEIGHT | TIME  | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT                     | TIME             |
| 44x9 | 27.4   | 90'   | 23.6   | 90'  | 19.6   | 90'  | 18.4   | 90'  | 17.9                       | 90'              |
| 42x9 | 26.6   | 90'   | 22.6   | 90'  | 19.0   | 90'  | 17.8   | 90'  | 17.4                       | 90'              |
| 40x9 | 25.8   | 90'   | 22.0   | 90'  | 18.5   | 90'  | 17.4   | 90'  | 16.9                       | 90'              |
| 38x9 | 25.0   | 90'   | 21.4   | 90'  | 17.9   | 90'  | 16.5   | 90'  | 16.4                       | 90'              |
| 36x9 | 24.3   | 90'   | 20.8   | 90'  | 17.4   | 90'  | 16.2   | 90'  | 15.9                       | 90'              |
| 34x9 | 23.5   | 75'   | 20.0   | 75'  | 16.8   | 75'  | 15.6   | 75'  | 15.3                       | 75'              |
| 32x9 | 17.9   | 75'   | 15.4   | 75'  | 13.0   | 75'  | 12.1   | 75'  | 11.8                       | 75'              |
| 30x9 | 17.3   | 60'   | 14.9   | 60'  | 12.5   | 60'  | 11.7   | 60'  | 11.4                       | 60'              |
| 28x9 | 16.7   | 60'   | 14.4   | 60'  | 12.0   | 60'  | 11.3   | 60'  | 10.9                       | 60'              |
| 26x9 | 16.0   | 60'   | 13.9   | 60'  | 11.6   | 60'  | 10.8   | 60'  | 10.4                       | 60'              |
| 24x9 | 15.4   | 45'   | 13.4   | 45'  | 11.2   | 45'  | 10.3   | 45'  | 10.0                       | 45'              |
| 22x9 | 14.8   | 45'   | 12.8   | 45'  | 10.7   | 45'  | 9.9    | 45'  | 9.6                        | 45'              |
| 20x9 | 14.2   | 45'   | 12.3   | 45'  | 10.2   | 45'  | 9.5    | 45'  | 9.2                        | 45'              |
| 18x9 | 13.6   | 45'   | 11.8   | 45'  | 9.8    | 45'  | 9.1    | 45'  | 8.8                        | 45'              |
| 16x9 | 13.1   | 45'   | 11.3   | 45'  | 9.3    | 45'  | 8.6    | 45'  | 8.4                        | 45'              |
| 14x9 |        |       | 10.7   | 30'  | 8.9    | 30'  | 8.2    | 30'  | 7.9                        | 30'              |
| 12x9 |        |       |        |      | 8.5    | 30'  | 7.8    | 30'  | 7.5                        | 30'              |
| 10x9 |        |       |        |      |        |      | 7.4    | 30'  | 7.1                        | 30'              |
| 9x9  |        |       |        |      |        |      |        |      | 6.6                        | 30'              |
| 8x9  |        |       |        |      |        |      |        |      | 6.2                        | 30'              |
| 7x9  |        |       |        |      |        |      |        |      | 5.7                        | 30'              |
| 6x9  |        |       |        |      |        |      |        |      | 5.3                        | 30'              |



To determine the weight and time of a rectangular reducing joint with two branches opposite, add to the time of a reducing joint with one branch according to following table:

| D  | E   | DEPTH OF DUCT |      |        |      |        |      |        |      |        |      |        |      |
|----|-----|---------------|------|--------|------|--------|------|--------|------|--------|------|--------|------|
|    |     | 7"            |      | 8"     |      | 9"     |      | 10"    |      | 12"    |      | WEIGHT | TIME |
|    |     | WEIGHT        | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME |        |      |
| 16 | 12" | 6.7           | 30'  | 6.9    | 30'  |        |      |        |      |        |      |        |      |
| 14 | 10" | 5.4           | 30'  | 5.7    | 30'  | 5.8    | 30'  |        |      |        |      |        |      |
| 12 | 9"  |               |      |        |      | 4.9    | 30'  |        |      |        |      |        |      |
| 12 | 8"  | 4.5           | 30'  | 4.5    | 30'  |        |      | 4.9    | 30'  |        |      |        |      |
| 12 | 7"  |               |      |        |      |        |      | 4.5    | 30'  |        |      |        |      |
| 10 | 7"  | 3.6           | 30'  | 3.7    | 30'  | 3.9    | 30'  |        |      |        |      |        |      |
| 10 | 6"  |               |      |        |      |        |      | 3.6    | 30'  | 3.9    | 30'  |        |      |
| 9  | 6"  | 3.01          | 30'  | 3.0    | 30'  | 3.5    | 30'  |        |      |        |      |        |      |
| 9  | 5"  |               |      |        |      |        |      | 3.3    | 30'  | 3.4    | 30'  |        |      |
| 8  | 5"  | 2.8           | 30'  | 3.0    | 30'  | 3.0    | 30'  |        |      |        |      |        |      |
| 8  | 4"  |               |      |        |      |        |      | 2.9    | 30'  | 3.3    | 30'  |        |      |
| 7  | 4"  | 2.8           | 30'  | 3.0    | 30'  | 3.0    | 30'  | 3.0    | 30'  | 3.3    | 30'  |        |      |
| 6  | 4"  | 2.8           | 30'  | 3.0    | 30'  | 3.0    | 30'  |        |      |        |      |        |      |
| 6  | 3"  |               |      |        |      |        |      | 3.0    | 30'  | 3.3    | 30'  |        |      |
| 5  | 3"  | 2.8           | 30'  | 3.0    | 30'  | 3.0    | 30'  |        |      |        |      |        |      |
| 5  | 2"  |               |      |        |      |        |      | 3.0    | 30'  | 3.3    | 30'  |        |      |
| 4  | 2"  | 2.8           | 30'  | 3.0    | 30'  | 3.0    | 30'  |        |      |        |      |        |      |
| 3  | 1"  |               |      |        |      |        |      |        |      |        |      |        |      |

| DUCT | STACK    | CUT A  |      | CUT B  |      | CUT C  |      | CUT D  |      |
|------|----------|--------|------|--------|------|--------|------|--------|------|
|      |          | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME | WEIGHT | TIME |
| 4x7  | 10x3 1/2 | 4      | 20'  | 3      | 20'  | 3      | 20'  | 3      | 20'  |
| 5x7  | 12x3 1/2 |        |      |        |      |        |      |        |      |
| 6x7  | 12x3 1/2 |        |      |        |      |        |      |        |      |
| 7x7  | 14x3 1/2 |        |      |        |      |        |      |        |      |
| 8x7  | 12x5     |        |      |        |      |        |      |        |      |
| 9x7  | 14x5     |        |      |        |      |        |      |        |      |
| 4x8  | 10x3 1/2 | 4      | 20'  | 3      | 20'  | 3      | 20'  | 3      | 20'  |
| 5x8  | 12x3 1/2 |        |      |        |      |        |      |        |      |
| 6x8  | 14x3 1/2 |        |      |        |      |        |      |        |      |
| 7x8  | 12x5     |        |      |        |      |        |      |        |      |
| 8x8  | 14x5     |        |      |        |      |        |      |        |      |
| 4x9  | 10x3 1/2 | 4      | 20'  | 3      | 20'  | 3      | 20'  | 3      | 20'  |
| 5x9  | 12x3 1/2 |        |      |        |      |        |      |        |      |
| 6x9  | 14x3 1/2 |        |      |        |      |        |      |        |      |
| 7x9  | 12x5     |        |      |        |      |        |      |        |      |
|      | 14x5     |        |      |        |      |        |      |        |      |
| 4x10 | 12x3 1/2 | 4      | 20'  | 3      | 20'  | 3      | 20'  | 3      | 20'  |
| 5x10 | 14x3 1/2 |        |      |        |      |        |      |        |      |
| 6x10 | 12x5     |        |      |        |      |        |      |        |      |
| 7x10 | 14x5     |        |      |        |      |        |      |        |      |
| 3x12 | 12x3 1/2 | 4      | 20'  | 3      | 20'  | 3      | 20'  | 3      | 20'  |
| 4x12 | 12x3 1/2 |        |      |        |      |        |      |        |      |
| 5x12 | 14x3 1/2 |        |      |        |      |        |      |        |      |
| 6x12 | 12x5     |        |      |        |      |        |      |        |      |
|      | 14x5     |        |      |        |      |        |      |        |      |



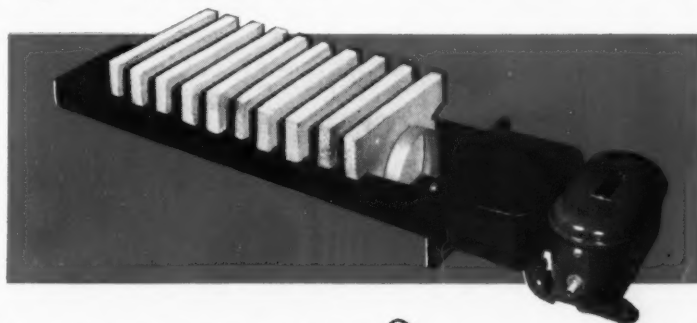
# Sell Fresh Air



## with Skuttle Automatic HUMIDIFIERS

WITH the public becoming more and more air conditioning minded, by recognizing the importance of having clean humidified air in the home during the long heating season we know that furnace dealers throughout the country can profit by this knowledge in letting Skuttle help them "Sell More Fresh Air" in 1938 with the famous Skuttle automatic humidifiers.

This public acceptance of the advantages to better health that air conditioning affords will certainly make them live prospects for a dealer who



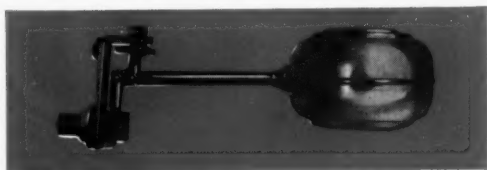
handles the Skuttle line, because he knows that every Skuttle humidifier he sells is backed by 22 years of specialized experience in manufacturing humidifiers, in other words the J. L. Skuttle Company stands behind every sale the dealer makes and assures him that every humidifier will give a lifetime

of dependable operation. This certainly instills confidence in the dealer, because he knows that when a sale is made he won't have to follow it up with costly service calls, that result in undermining the good will of his business.

### The FAMOUS SKUTTLE VALVE

Here is the reason Skuttle humidifiers give faultless performance and years of dependable service. This valve is opened and closed by the direct lever

action of the arm supporting the float, and a live rubber disc pressed tightly over the water inlet assures tight closing of the valve even after years of use.



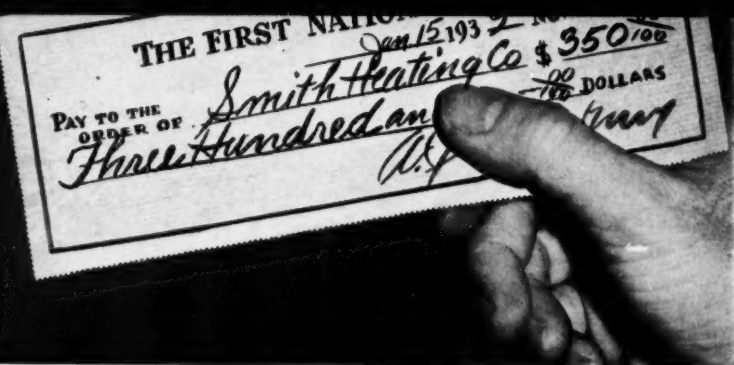
### Increase YOUR Profits THIS YEAR

Illustrated above is the popular Skuttle D S humidifier with Ceramics (optional equipment) that has been a consistent profit maker for dealers everywhere. Because its pan is made of drawn steel it has quick evaporating pick up, while its porcelain enamel finish both inside and out guards against oxidation and insures easy cleaning. The famous Skuttle water supply valve, float and water line connector are standard equipment as well as 10 ft. of copper tubing. Sizes available are 20" and 30", but we will make any size unit to your specifications. Let us send you literature describing these fast moving units, so that you can enjoy bigger profits in 1939.

**J. L. SKUTTLE COMPANY**  
999 FRANKLIN ST. DETROIT, MICH.



*Mr. Dealer:*  
**INCREASE YOUR PROFITS NOW!**



with the Michigan Tank & Furnace Corp. who  
back their Dealers with years of experience in building  
Quality furnaces to sell at the Lowest Prices

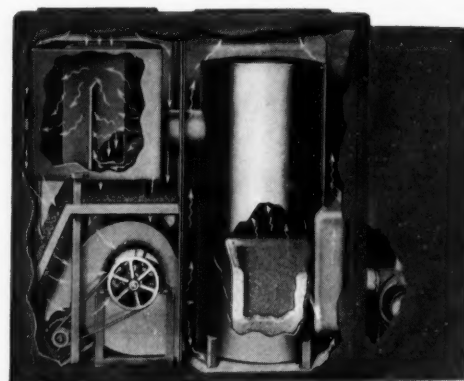


It has been proven in other industries and it is also true of the furnace industry that the manufacturer who has had years of experience in designing and manufacturing furnaces can sell a better furnace at a lower price. This is doubly true of the Michigan Tank & Furnace Corporation because due to their sales volume they can keep the prices of their units the lowest, and still give their dealers the best in quality construction. There is no mystery then, when Michigan Tank & Furnace dealers do enjoy increased profits each year, for they have confidence in the products they sell, knowing that it is the best furnace value on the market today.

*Comfortzone*

**OIL-FIRED SERIES**

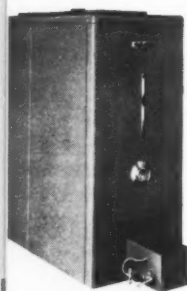
Made in sizes from 75,000 to 500,000 B.T.U. output, the Comfortzone winter air-conditioning automatic oil-fired series are designed along sound engineering lines which insure the most in heat conversion and economy. This furnace can be fired with either oil or gas, comes completely equipped with all controls ready to install. Some of its outstanding features are: combustion chamber shell 7-gauge steel welded, airtight, proof filters, automatic humidifier and rubber-mounted blower motor. The cut-away view at the right will give you an accurate picture of the way air passes through the furnace and filters and also the path followed by the products of combustion as they pass to the flue.



Below is a cross section view of the Comfortzone, clearly illustrating the method in which this furnace filters and efficiently heats the air before it is circulated throughout the house.

**COMFORTZONE**  
G-90

**GAS-FIRED SERIES**



The ideal gas-fired job for the moderately priced home. Its compact construction takes up a minimum of space in small basements or utility rooms. It delivers 90,000 B.T.U.'s at registers and has a very efficient type of burner that spreads the flame near the floor of the heating compartment so that all of the compartment surface is available for heat conversion. This burner will burn natural, manufactured or mixed gas.

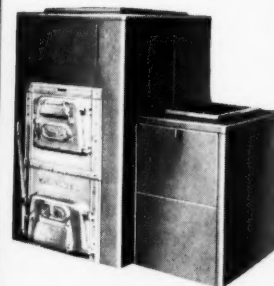
**STOKER, OIL or HAND-FIRED COAL FURNACES**



● The Chevron gravity boiler plate steel furnace can be equipped for either oil burning, stoker or hand firing. Its body and radiator are riveted and welded, thus assuring a gas-tight job. Made in sizes from 20' to 34'



● The Cadillac is a popular priced furnace designed for the lower priced homes. It has the same rugged duplex grates and clinker-resisting fire brick found in the Chevron, and can also be equipped for oil, stoker or hand firing. Comes in four sizes: 20' 22' 24' 27'



● Above is illustrated the beautiful square casing job that is available with the Chevron and Cadillac furnaces. This includes the blower removable filters and automatic humidifier, and circulates clean, warm air in the winter and the cool basement air throughout the house in the summer

**MICHIGAN TANK & FURNACE CORP**  
14101 Prairie Ave., Detroit, Mich.

Gentlemen:  
Please send complete information and prices on the following:

☐ Comfortzone  
☐ Chevron

☐ Comfortzone G-90  
☐ Cadillac

Name \_\_\_\_\_  
Street \_\_\_\_\_ State \_\_\_\_\_  
City \_\_\_\_\_

**WRITE FOR STYLES AND PRICES TODAY!**

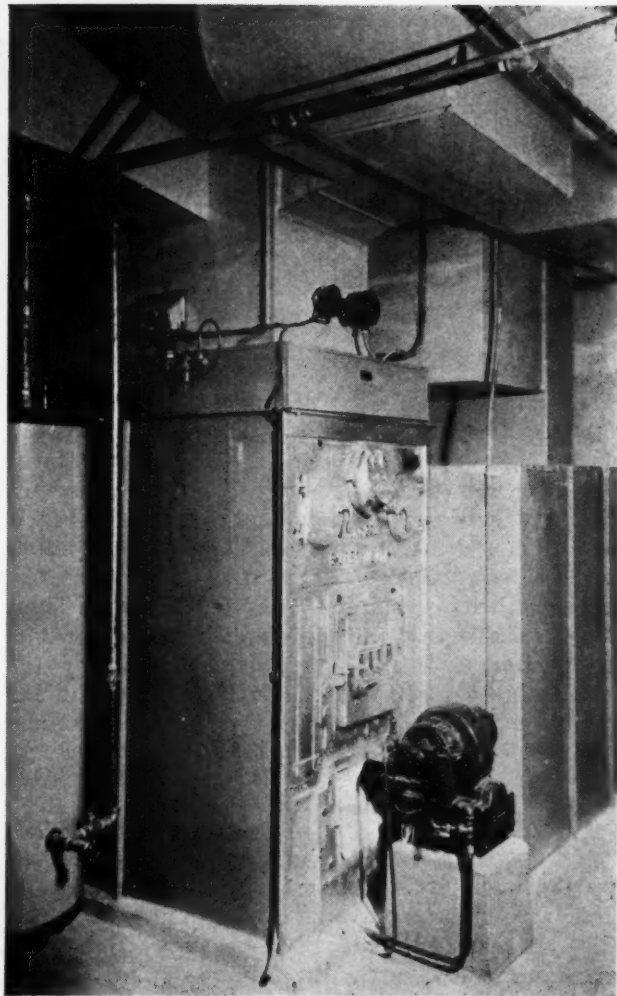
**MICHIGAN TANK & FURNACE CORP.**

14101 PRAIRIE AVE. • DETROIT, MICH.



# Summary of Oil Burning Furnace Design

Conducted by the  
Research Advisory Committee  
N. W. A. H. & A. C. Assn.



**I**N general, the capacity and efficiency of oil-burning furnaces are dependent upon seven factors, which may be grouped into two classifications as shown in Table 1.

Table 1

## Factors Affecting Capacity and Efficiency of an Oil-Burning, Warm-Air Furnace

- I. Combustion characteristics
  1. Type of burner
  2. Rate of oil input
  3. Percentage of CO<sub>2</sub> in flue gas
  4. Conditions of draft in combustion chamber
- II. Furnace characteristics
  5. Amount and location of heating surfaces
  6. Size and shape of combustion space
  7. Quantity of air circulated.

A study made with two types of furnaces of some of the factors that determine the capacity of oil-burning furnaces was presented in the paper entitled, "Performance of Oil-Fired, Warm-Air Furnaces in the Research Residences," by A. P. Kratz and S. Konzo, which was published in *AMERICAN ARTISAN*, October, November, December, 1937. These studies were made with two radically dif-

ferent types of furnaces in both of which neither the amount nor the location of the heating surfaces could be altered. Furthermore, neither the type of burner nor the size and shape of the combustion space in either furnace was changed. Hence the studies on furnace performance were confined to tests in which the rate of oil input, the percentage of CO<sub>2</sub> in the flue gas, and the quantity of air circulated were independently varied in magnitude.

The studies in the Research Residence did not afford any means of evaluating the effectiveness of different amounts and locations of heating surfaces. Furthermore, for a given total amount of heating surface, data were not obtainable on the relative proportion of direct and indirect heating surface required for optimum results. A careful consideration of a schedule of tests required for the proper determination of the effectiveness of different amounts and locations of heating surfaces indicated that an enormously large number of routine tests would be necessary. Owing to the lack of uniformity in the design of oil burning furnaces any results obtainable with a given type of furnace would probably not be applicable to any other type. In addition, slight changes in the arrangement of the combustion chamber or the type of burner used might materially affect the capacities and efficiencies. Thus a limited number of tests made with a few types of furnaces would not yield results that would be generally applicable, whereas a complete series of tests would require a prohibitive expenditure of time and money.

As an alternative procedure under these limiting conditions it was considered that an analysis of the design practice of the industry might be of interest. The determination made individually by the separate manufacturers could be regarded as a summary of their experiences and recommendations, and conclusions drawn from such data would not be valid provided that the existing types and proportions were the result of evolution or independent development by the various manufacturers and were not merely modified copies of previously existing apparatus.

During 1936 and 1937 a questionnaire was distributed to the manufacturers of oil burning fur-



naces and of oil burners. This report contains a summary of the replies received.

### Summary

#### Unit No.

The oil-burning furnace units were designated by an index, such as F-1a, and replies were tabulated in the order received.

#### Type of Burner

Seventeen of the manufacturers specified the mechanical atomizing, gun type burner for their units, fifteen of which were of the high-pressure type, utilizing oil pressures of 100-lb. per sq. in. at the nozzle. Five manufacturers specified vaporizing type oil burners and two specified rotary type oil burners. Since no attempt was made to determine the number of units sold by each manufacturer, these numbers cannot be regarded as representative of the number of units actually in use.

#### Oil Input Rate

The rate of oil input ranged from 0.7 gallon per hour to 4.0 gallons per hour. The rate for the vaporizing type burners ranged from 0.7 to 1.5

### Capacity of Bonnet

The total rated capacity of the unit at the bonnet, or plenum chamber, ranged from 72,000 Btu. per hour to 450,000 Btu. per hour. In Fig. 1a is shown a graphical representation of the capacities plotted against the oil input rate. It may be noted that for a given input of 1.5 gallons per hour the rated capacities for the different units ranged from 142,800 Btu. per hour to 196,000 Btu. per hour or a total spread of 52,200 Btu. per hour.

### Flue Gas Temperatures

The maximum flue gas temperatures ranged from 250 deg. F. to 700 deg. F. with an average of 450 deg. F., while the minimum flue gas temperatures attainable, or allowable, ranged from 190 deg. F. to 550 deg. F. with an average of 350 deg. F. It may be noted that a minimum flue gas temperature of less than 350 deg. F. was stated for a considerable number of the units. As will be shown later, it is probable that the recommended value for flue gas temperature was determined largely by the actual flue gas temperature that could be attained by the given unit rather than by any predetermined value selected for the design of the unit.

### Carbon Dioxide, Per Cent

The percentage of CO<sub>2</sub> in the flue gas, as given by the manufacturer, ranged from 9.0 per cent to 15 per cent, with an average value of approximately 11.0 per cent. In practically all cases, the minimum recommended value for the CO<sub>2</sub> was approximately two per cent lower than the value attained under the most favorable operating conditions determined by the manufacturer, or was equal to approximately 9.0 per cent.

### Bonnet Efficiency, Stated

The values listed for efficiency at the bonnet, as stated by the manufacturer, ranged from 70 per cent to 85 per cent.

### Bonnet Efficiency, Calculated

Since both the capacity at the bonnet and the rate of oil input to the unit were specified, the bonnet efficiencies could be independently determined by calculation. These values were obtained from the following equation:

$$\text{Percentage Bonnet Efficiency Calculated} = \frac{\text{Capacity at bonnet, Btu. per hr.}}{\text{oil input rate in lb. per hr.} \times 141,000} \times 100$$

in which 141,000 represents the average heating value of No. 3 fuel oil. It was noted that some discrepancy exists between the efficiency as stated, and the efficiency, as calculated. These discrepancies can only be accounted for on the basis that in some cases the bonnet efficiency has been assumed as identical with the combustion efficiency.

The combustion efficiency is obtained from determinations made of the composition and tempera-

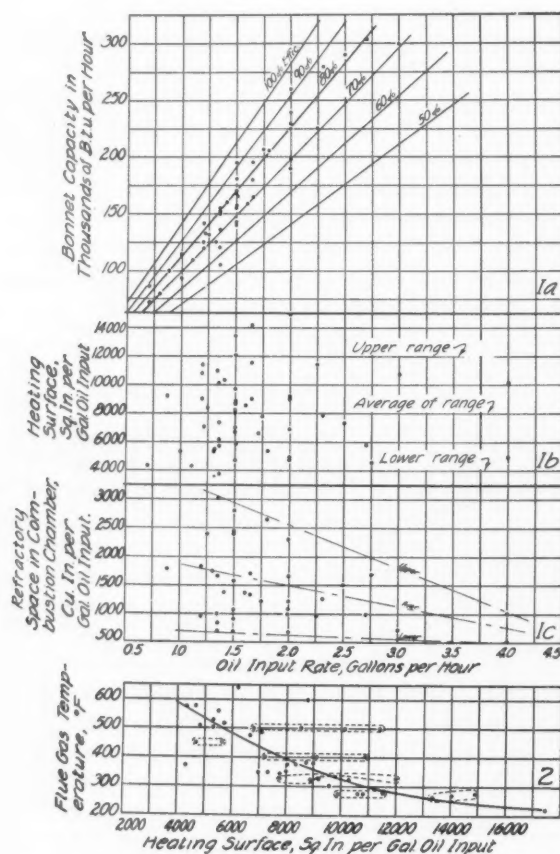


Fig. 1—Bonnet capacity, heating surface, refractory space, flue gas temperature reported by furnace manufacturers.

gallons per hour, while that for the gun-type burner, with one exception, ranged from 1.2 to 4.0 gallons per hour.

ture of the flue products only, and can be readily determined when those two factors are evaluated. The bonnet efficiency takes into account the additional factors of heat losses through the ground, through the casing, and through the plenum chamber and should be determined from actual test.

In the graphical plotting of capacities shown in Fig. 1a, lines of equal efficiencies were superimposed. It is of interest to note that the efficiencies as calculated from the data submitted by the manufacturers ranged from a value as low as 55.5 per cent to as high as 92.5 per cent. The efficiencies of the majority of the furnace units could be included between the range of 70 per cent and 85 per cent. It is somewhat doubtful whether efficiencies in excess of 85 per cent are actually attainable and more conservative ratings of the units would probably be justified. A proper understanding of the difference between combustion efficiency and bonnet efficiency would lead to less confusion in the published statement of the efficiencies and capacities of furnaces. It is apparent that the only accurate method of determining performance characteristics is by an actual laboratory test to determine bonnet capacities and bonnet efficiencies.

In this connection the practice of the American Gas Association in restricting the published value of the bonnet efficiency to 70 per cent might also be applied to oil-burning units, particularly since the results obtainable in the field are usually not as favorable as those obtained by laboratory tests. In any case performance ratings should show consistency in the values given for oil input, bonnet capacity, and bonnet efficiency.

### Heating Surfaces

Heating surface has been defined as that surface which is exposed to the products of combustion on one side and circulating air on the other.

### Heating Surface per Gallon Input

a. Values were listed to show the heating surface per gallon of oil input. The direct heating surface, or the surface that is exposed to the radiation from the flame, ranged from 1,330 sq. in. to 9,360 sq. in. per gallon. The indirect heating surface, or that which is exposed to the hot gases alone, ranged from 864 sq. in. to 11,900 sq. in. per gallon.

A great divergence exists in both the total heating surface per gallon of oil input and the relative proportion of direct heating surface to indirect heating surface. This is shown graphically in Fig. 1b in which the data on heating surface per gallon of oil input has been plotted against the oil input rate. The average value of all the data plotted was approximately 8,000 sq. in. per gallon of oil input. In general, where more than one sized unit was made by a given manufacturer, the heating surface per gallon was smaller in magnitude for larger rates of oil input.

It should be recognized in all discussions, of heating surface that mere quantity alone is not a fair criterion by which to evaluate the effectiveness

of different furnaces. Obviously, a large amount of surface ineffectively located may not be as satisfactory as a smaller amount of surface that effectively transmits the heat from the hot gases to the circulating air. The wide divergence in the types of furnaces and in the allocation of the heating surfaces is reflected in the wide spread of the plotted points. Therefore, unless the type of furnace is rigidly specified, any results obtained from laboratory tests made to determine the optimum required amount of heating surface may not prove applicable to other types of furnaces.

b. Since a high combustion efficiency is dependent on the attainment of a low flue gas temperature the design of oil-fired furnace units might be based on the heating surface required to produce a reasonably low flue gas temperature. As was indicated in the paper on "Performance of Oil-Fired, Warm-Air Furnaces in the Research Residence" by Kratz and Konzo, if sufficient effective heating surface is provided by the furnace manufacturer so that the temperature of the leaving flue gases will be low, then the unit may be expected to perform satisfactorily under diverse conditions of installation in the field, even with fairly wide deviations in the adjustment of the fuel-air ratio for the oil burner.

### Heating Surface vs. Flue Temperature

In this connection the graphical representation in Fig. 2 with the average flue gas temperature plotted against the heating surface per gallon is of interest. In this figure the average of the maximum and minimum flue gas temperature specified by each manufacturer was plotted in order to determine whether there existed any correlation between the temperatures and the heating surface. Where only one value of flue gas temperature was stated for two or more models of the furnace, the value has been plotted against each value of heating surface and the points have been enclosed within an area bounded by a dotted line to indicate that they are for similar units. Although no exact correlation could be expected, it is nevertheless of interest to note that in general the flue gas temperature which was stated was dependent to some extent on the amount of heating surface used. With few exceptions, for heating surfaces less than 7,000 sq. in. per gallon of oil input the average flue gas temperature was greater than 400 deg. F., and for heating surfaces greater than 7,000 sq. in. per gallon of oil input the flue gas temperature was less than 400 deg. F.

c. A comparison of the heating surfaces provided for hand-fired, coal-burning furnaces and those provided for oil-burning furnaces is also of interest. In the case of hand-fired, coal-burning furnaces a large portion of the heat is transmitted by radiation from the incandescent fuel bed to the heating surfaces. However, in the case of oil combustion the amount transmitted by radiation is not large and hence a relatively greater amount of heating surface must be provided in order to facili-

tate the transmission of heat by convection from the flue gas to the heating surfaces.

The values obtainable from "The Standard Code Regulating the Installation of Gravity Warm Air Heating Systems in Residences" show that the rating of a conventional gravity furnace having a ratio of heating surface to grate area of 20 to 1 is based on a combustion rate of 7.5 lb. per sq. ft. of grate per hour when fired with coal having a heating value of 12,790 Btu. per lb. The heating surface employed per 1,000 Btu. per hr. supplied to the furnace is, therefore equal to

$$\frac{20 \times 144 \times 1000}{7.5 \times 12,790} = 30 \text{ sq. in.}$$

In the case of the oil-fired furnaces, with few exceptions the heating surface provided per gallon of oil input ranged from 4,000 sq. in. to 12,000 sq. in. with an average of approximately 8,000 sq. in. The values of the heating surface provided per 1,000 Btu. supplied to the furnace per hr. are as follows:

$$\begin{aligned} \text{Lower Limit } \frac{4000 \times 1000}{141,000} &= 28 \text{ sq. in.} \\ \text{Upper Limit } \frac{12,000 \times 1000}{141,000} &= 85 \text{ sq. in.} \\ \text{Average } \frac{8000 \times 1000}{141,000} &= 57 \text{ sq. in.} \end{aligned}$$

It may be noted that in general the oil-burning furnaces are equipped with much greater amounts of heating surface per unit of heat input than the conventional hand-fired, gravity warm-air furnace. To a very great extent the improved fuel consumptions maintained with furnaces specifically designed to burn oil as compared with that for conversion burner installations can be attributed to the greater amount of heating surface used. The average value of 57 sq. in. per 1000 Btu. input corresponds to an overall heat transfer rate of about 2500 Btu. input per sq. ft. of heating surface per hour.

d. In this connection, the prevailing practice for the design of steel heating boilers is also of interest. The value obtainable from the "Standard Ratings adopted by the Steel Heating Boiler Institute" (January 29, 1936) for hand-fired, coal-burning boilers is equal to 32.2 sq. in. per 1000 Btu. input per hour, or approximately one-half that for the average oil-burning furnace.

$$\frac{129 \times 144 \times 0.75 \times 1000}{432,000} = 32.2 \text{ sq. in. per 1000 Btu. input per hour. (Assuming 75 per cent overall efficiency.)}$$

This corresponds to an overall heat transfer rate of 4470 Btu. input per sq. ft. of heating surface per hour. The practical average rates of heat transfer for boilers as given by the 1933 edition of the A.S.H.

Guide (Chapter 14, page 250) range from 2500 to 4000 Btu. output per sq. ft. per hr. or approximately 3330 to 5330 Btu. input per sq. ft. per hour. These values are much larger than the 2525 Btu. rate for the average oil-burning furnace. This is consistent with the fact that the rate of heat transfer across the barrier between hot gases and water is theoretically greater than the rate of heat transfer across a similar barrier between hot gases and air.

#### Space in Refractory Portion

The space enclosed by refractories in cu. in. per gallon ranged from 552 cu. in. per gallon to 3382 cu. in. per gallon and are shown plotted in Fig. 1c. It may be noted that a majority of the values were included between 750 and 1750 cu. in. per gallon. In general the value was smaller for larger rates of oil input. These values corresponded to heat releases of 325,000 Btu. per cu. ft. and 139,200 Btu. per cu. ft. of refractory chamber space.

#### Area Above Refractory Portion

This area, which is commonly referred to as the floor area of the combustion chamber, ranged from 40 sq. in. to 471 sq. in. per gallon although a majority of the values were included in the range between 70 and 110 sq. in. per gallon.

#### Space Above Refractory Portion

The space required in the combustion chamber above the refractory portion is not limited by the combustion conditions nor by the available space to the same extent as the space required in the refractory portion. Hence large deviations in practice are expected. The values range from 1.5 cu. ft. per gallon to 13.6 cu. ft. per gallon, with an average of approximately 5.9 cu. ft. per gallon. These values corresponded to heat releases ranging from 14,000 Btu. per cu. ft. to 10,400 Btu. per cu. ft. of space above the refractory portion of the combustion chamber.

The heat releases based on the total volume including the refractory combustion chamber and the space above the refractory chamber ranged from 64,100 Btu. input per cu. ft. to 9,700 Btu. input per cu. ft. with an average value of approximately 21,000 Btu. input per cu. ft.

In this connection the practice of the boiler manufacturers is of interest. In the Code for Rating of Steel Heating Boilers adopted by the Steel Heating Boiler Institute the specifications read, "B—The furnace volume (considered as the cubical content of the space between the bottom of the fuel bed and the first plane of entry into or between the tubes) for a boiler in which oil, gas or bituminous coal, stoker-fired is burned, shall be not less than one cubic foot for every one hundred and forty square feet of steam rating." This corresponds to a heat release of 44,800 Btu. input per cu. ft. of furnace volume.

$$\frac{140 \times 240}{1 \times 0.75} = 44,800 \text{ Btu. input per cu. ft.}$$

(Continued on page 156)



# WHAT IS PREMIER PULLING OUT OF THE HAT for 1939

Take a tip from Tim Snip, the new PREMIER puppet! Get your request in NOW for the 1939 PREMIER Dealer Portfolio and Catalog! For here is a proposition that is going to put cold cash into the pockets of dealers who can qualify!

This new PREMIER program is so practical and complete that it can't help proving a real money maker. Just think! Premier offers a complete line—heating, air conditioning, cooling, and automatic heating equipment, priced right and bristling with selling features. PREMIER likewise offers a complete program of dealer helps—prospect follow-up service, engineering assistance, advertising helps, and 3 time-payment plans. PREMIER offers EXCLUSIVE TERRITORY, in which your present profits and future success are safeguarded.

And more than this, PREMIER offers something BRAND NEW for 1939. We can't explain it here. You'll have to read the portfolio to find out. All we can say is that it's a new low price and quantity discount plan that will net you more dough on every installation!

Act right now! Put your name on the coupon below and shoot it back to us today! For a 3-cent stamp this coupon will bring you more good dealer dope than you've seen in many a moon.



**PREMIER FURNACE COMPANY, DOWAGIAC, MICH.**  
MANUFACTURERS OF WARM-AIR HEATING AND AIR CONDITIONING EQUIPMENT

**Snip this Coupon NOW!  
Get This New Profit Plan  
While it's Hot!**

Gentlemen:

Without obligation, send me your 1939 Dealer Portfolio and Catalog, fully describing your complete line, your complete program of dealer helps, your exclusive dealer franchise, and your new pricing plan.

Firm Name .....

Street No. ....

City .....

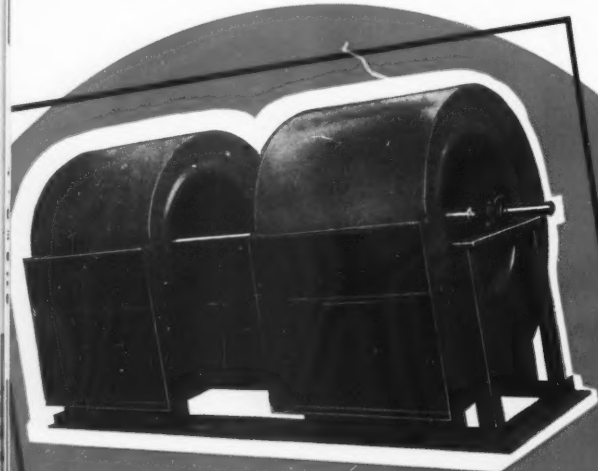
State .....

By .....

FAN WHEELS and ASSEMBLIES  
*for every*  
FORCED AIR HEATING  
and AIR CONDITIONING NEED

## Even in These Small Units We Maintain the Traditional Clarage Quality Standards

Furnace manufacturers and dealers find Clarage a dependable source of supply. This small fan equipment is backed by sound, conservative engineering, and a quarter-century of experience. It is built to the same standards of excellence which have made the larger Clarage air handling and conditioning products FIRST CHOICE of discriminating buyers the world over.

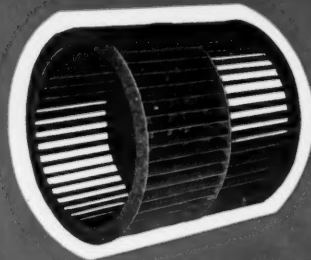


### DUPLEX FANS\*

A Duplex Unit, offered in ten sizes, consists of two Complete Fans mounted together on one base as shown above. Both wheels are mounted on one shaft turning on self-aligning, self-lubricating bearings.

All of these small Clarage Fans are **EXCEEDINGLY QUIET IN OPERATION**, when driven either by V-bolt drive or direct connected to motor. This silent performance is assured by **SLOW SPEEDS**, perfectly balanced wheels, and the use of highest-grade bearings.

\*Write for Bulletin 33, giving full data including fan capacities. Better still, have Clarage engineers submit a recommendation covering your particular requirements.

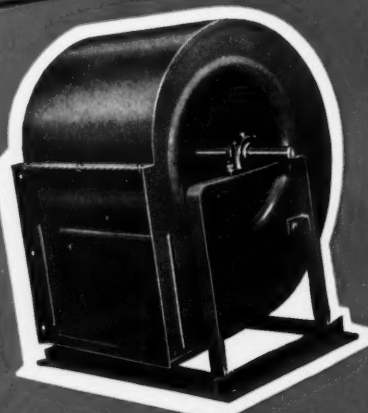


### ANY CAPACITY—ANY SPEED\*

Clarage Wheels can be furnished in ten sizes and in a variety of widths in each size, thus meeting any capacity demand at any operating speed.

These Wheels are of the Double Multiblade Type as shown above, built with two sets of perfectly formed blades securely anchored to the center plate and rims. Each Wheel is **BOTH STATICALLY AND DYNAMICALLY BALANCED**—quiet, smooth-running and free from vibration.

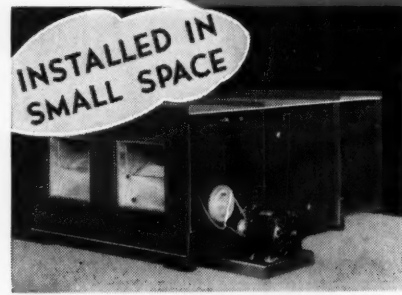
Housings, too, in any of ten sizes can be furnished separately where required.



### COMPLETE FANS\*

A Complete Fan, offered in ten different sizes, consists of a Clarage Double Multiblade Wheel, Fan Housing, Shaft, Bearings, Bearing Supports and Base. Bearings are self-aligning and self-lubricating, of bronze-graphite type which requires filling of oil reservoir but once a season. The Shaft is of liberal size to insure ample strength and rigidity. The entire assembly is **VERY COMPACT AND TAKES EXTREMELY SMALL SPACE**. Cold air inlet boxes can be furnished as part of standard equipment.

INSTALLED IN  
SMALL SPACE



Clarage Multitherm Conditioning Units (suspended and floor types) are ideal for retail stores, small restaurants, offices, etc. Furnished in various equipment combinations to give cooling, heating or complete air conditioning. Very compact; easily installed.

Ask for Bulletin 107.

COMPLETE  
AIR CONDITIONING  
•  
COOLING  
•  
VENTILATION  
•  
FACTORY HEATING  
•  
MECHANICAL DRAFT  
•  
FANS and BLOWERS  
for  
INDUSTRIAL NEEDS

**CLARAGE FAN COMPANY** KALAMAZOO, MICH.  
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES





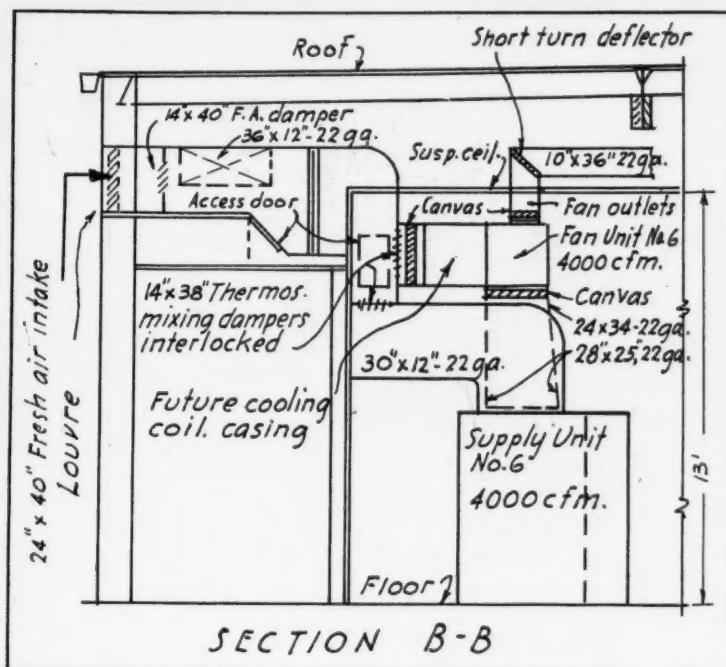


Fig. 4—(Section B-B) showing arrangement of apparatus and air plenums.

IN River Forest, Illinois, Chicago suburb, there was completed during the summer of 1938 an interesting store building heating project incorporating two one-story buildings with five stores in one building, eleven stores in the second and each store having its own gas-fired, forced air heating system, located at the rear of the store served.

The general arrangement of the buildings and stores is shown in the floor plan. By placing the heating plants in a corner, at the rear, it was possible to make one chimney, with a double flue, serve two stores, with one exception.

The equipment used, as shown in the elevations and cross sections, is somewhat unusual purposely made so to accommodate the specifications which called for a winter heating system using 100 per cent recirculation or 100 per cent outside air or mixtures of each; plus straight ventilation for summer operation using all outside air or mechanical cooling using pre-selected mixtures of air.

Detail section B-B and part plan for stores 6 and 7 show typical arrangements of apparatus for the larger stores. The elevation shows the furnace on the store floor level with the blower mounted in a special housing above the furnace, the interlocked mixing dampers, filters, housing for future cooling coils, outside air intake, recirculating duct and that part of the warm air supply system which lies within the furnace room.

#### General Heating Plan

In the larger stores the air flow plan is as follows: The air from outside enters the duct, passes through a set of dampers, then through the filters which are set vertically and in a single row (see detail B-B), turns down through one section of the interlocked mixing dampers, turns over the furnace casing where it divides into two parts; one part drops down each side of the casing passing over the

# Basementless Heating Systems for a 16-Store Project

By G. V. Zintel

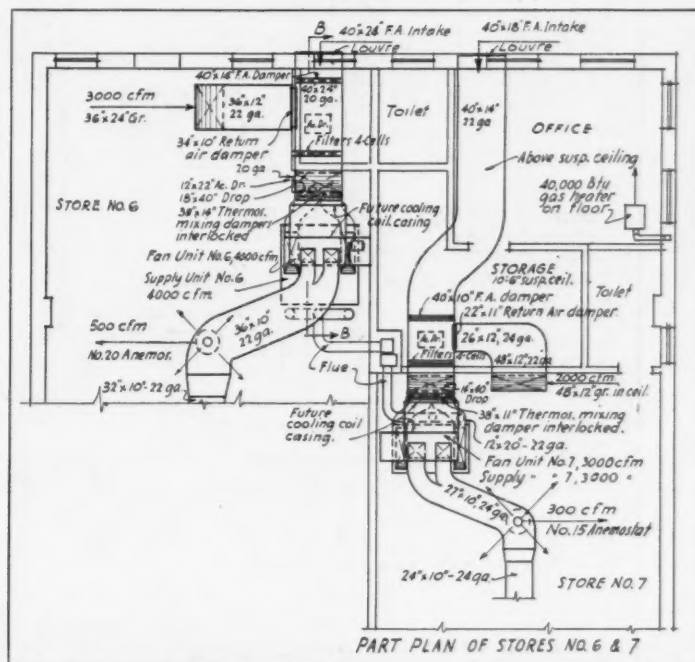
Himelblau, Byfield & Co., Chicago

radiator sections of the Dail furnace, then enters the bottom of the primary heating chamber. The top mounted blowers pull the air through the furnace and push the air into the ducts. This flow diagram is plainly shown in detail B-B and the plan in Fig. 3.

#### The Furnaces and Blowers

In the usual Dail furnace the blower or blowers are mounted above the combustion chamber and within the casing. In all these furnaces an individual blower (Bayley) of the type where the blower, housed as a separate unit with the motor outside the housing, is placed above the furnace as shown in B-B. In the larger furnaces the blower is a twin unit; in the smaller furnaces a single

Fig. 3—Plan of a double-wheel fan system showing outside and return air ducts, supply and apparatus.





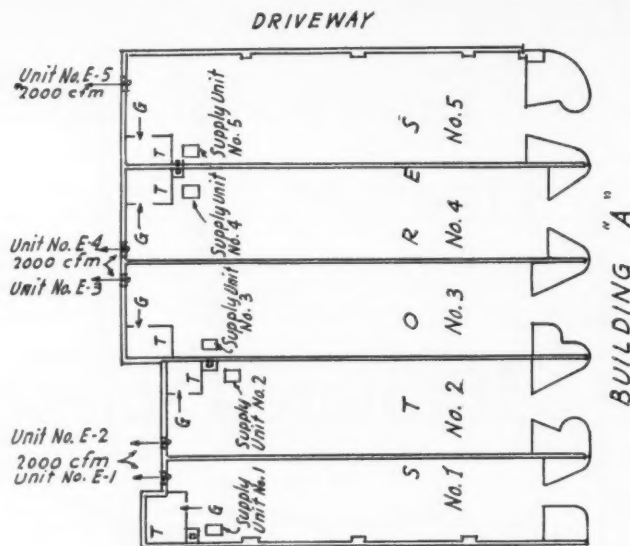
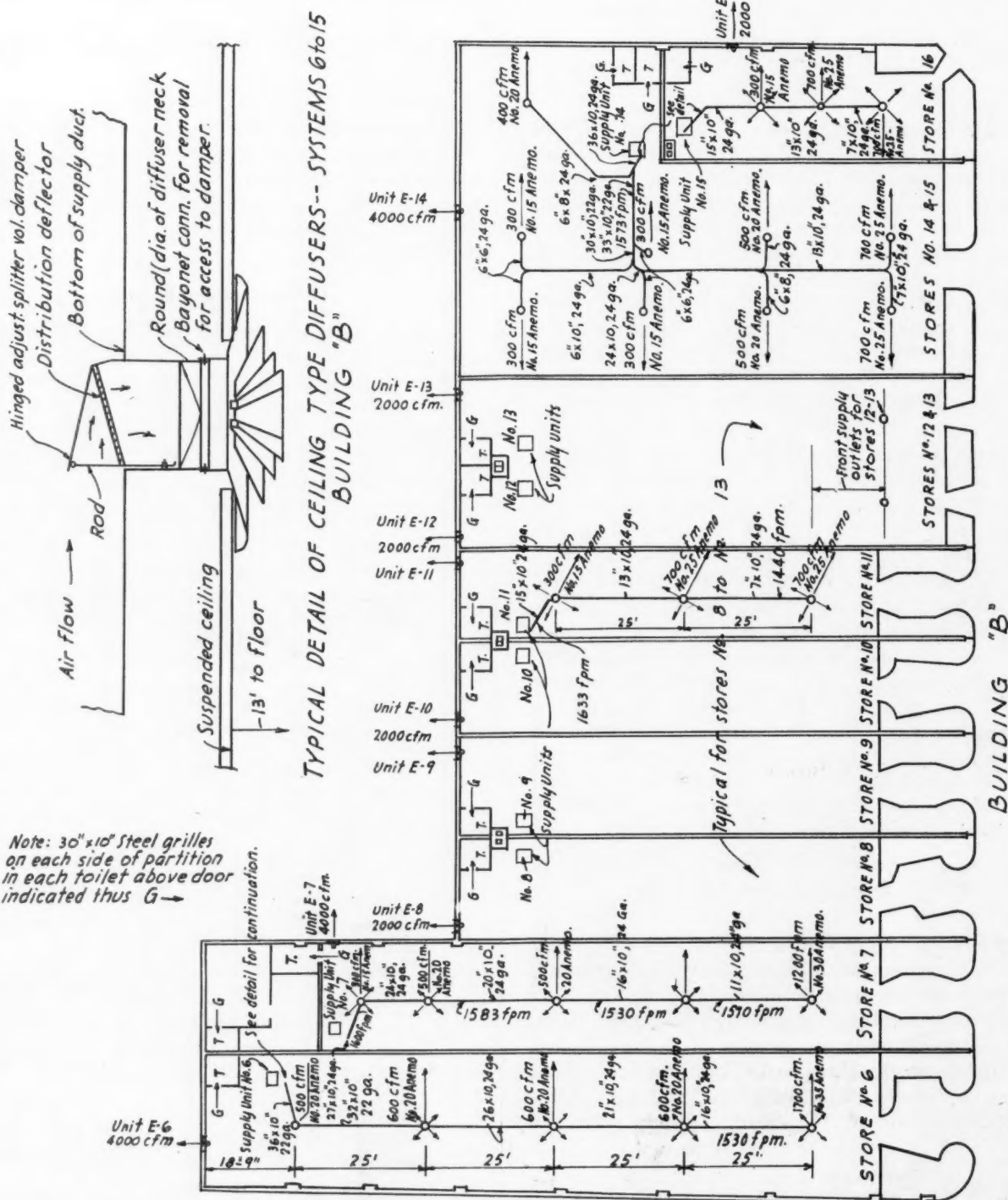


Fig. 1—Plan layout of the sixteen stores with heating systems located; also principal features of the different systems and a detail of the air distribution scheme. Note Group A employs a "blow in" plan; Group B has complete air distribution and concealed overhead duct work. See other sketches for details of equipment.



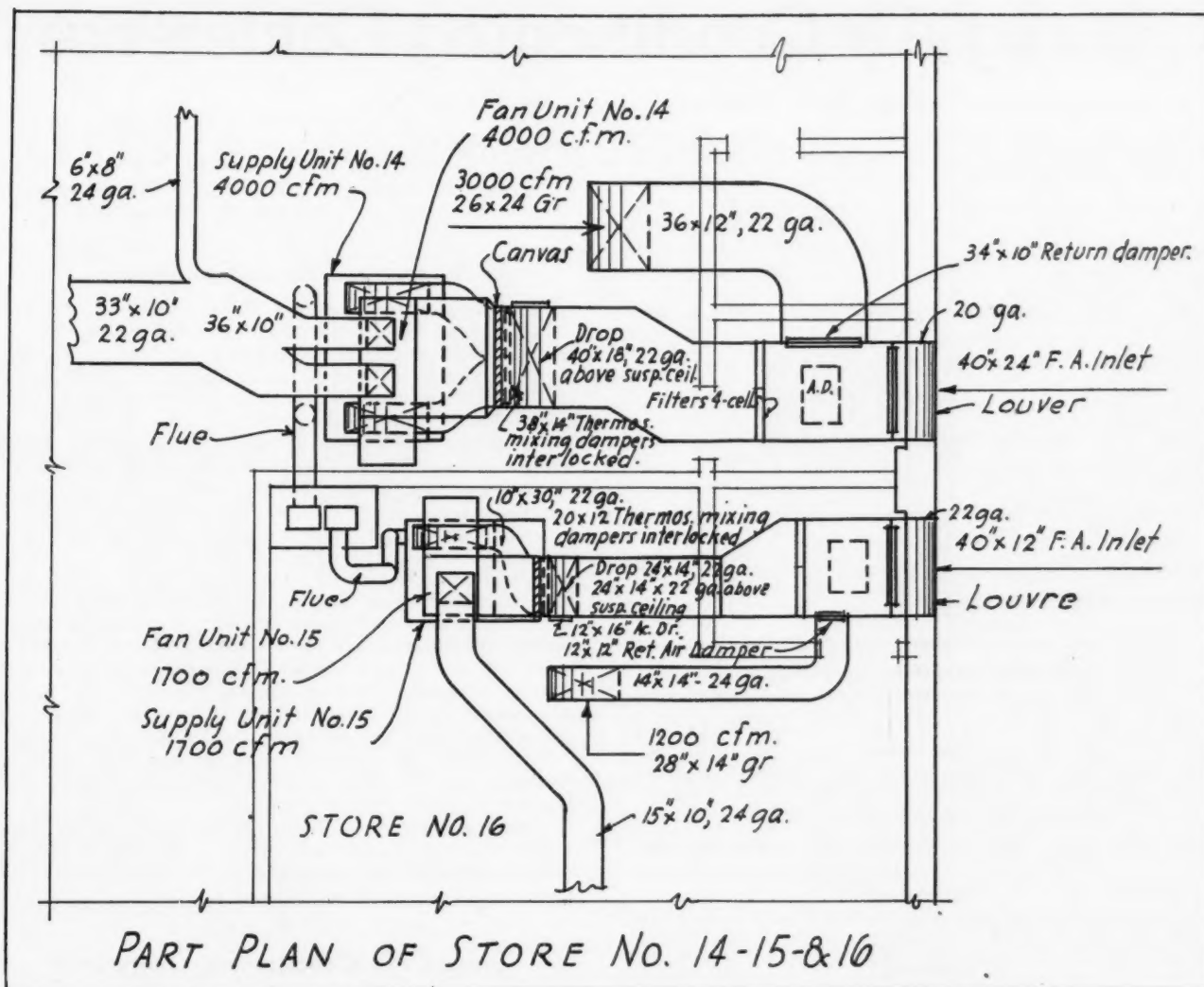


Fig. 2—Detail of equipment layout for the largest store and a small store inset within the larger space.

wheel and the number of wheels determines whether the warm air is taken off as two branches joining to form the trunk (Fig. 3) or as a direct trunk (Fig. 2).

Cooling coils are provided for (Fig. 3) and have a damper which opens the coil directly to the outside air, or directly to the return air line, or to proportions of each by proper adjustment of the dampers in the outside air intake and at the junction of the outside air and return air pipe (see Detail B-B and Fig. 3).

By making the proper adjustments of dampers, the owner can assure himself of the most advantageous heating or cooling cycle. He may recirculate 100 per cent in winter; he can use all outside air heated in winter; he can admit varying proportions of outside air in heating; in summer he can recirculate 100 per cent using no mechanical cooling; he can mechanically cool 100 per cent of recirculated air or outside air or mechanically cool mixtures of outside and inside air.

One of the interesting features of these store heating systems is the air distribution method. Contractors doing this type of work often feel that one central supply line should be cheaper than two lines, but use the two-line system in order to be

sure of uniform air distribution throughout the heated area.

In these stores the rectangular supply in the furnace room is carried up into the space between the ceiling and the roof and follows along the center line of the store. At intervals a square supply branch is cut into the bottom of the duct and brought through the ceiling as shown in the upper detail in Fig. 1. Proper air volume is obtained by adjusting the hinged damper which forms a lid for the deflector face in the top of the branch. Closing this damper completely cuts off any supply branch. Lifting the damper acts as an air scoop into the air stream.

Uniform air distribution over the space is obtained by installing diffusers (Anemostats) in the base of the branch pipe. These units are sized for different velocities, in this case a maximum of 4,000 feet per minute, through the device. The air leaving the diffuser draws approximately 35 per cent of its discharge cfm from the air of the room, mixes this room air with the air issuing from the diffuser. This aspirating effect sets up a slow, even flow of air within the room toward and away from the breathing level so that horizontal equalization of

(Continued on page 142)

# Coming Air Conditioning Conferences

## Michigan State College Short Course

The eighth annual Forced Warm Air Conference will be offered by Michigan State College, East Lansing, Michigan on March 27, 28, 29, 30 at the college. The program of courses has not been completely developed, but a preliminary schedule is published herewith to afford readers an opportunity to study the many subjects offered and covered. Further announcements will be published in the February and March issues.

This course is sponsored by the National Warm Air Heating and Air Conditioning Association and conducted by the Mechanical Engineering Department, Michigan State College.

### GENERAL SESSIONS

#### Monday, March 27 (Morning)

Registration—Olds Hall  
Instruction and Practice in the Use of the Slide Rule, L. N. Field, Prof. Drawing & Design, M. S. C.  
Luncheon—M. S. C. Union  
111 Olds Hall—"Principles of the Design of Air Distribution in Free Space," by S. Konzo, University of Illinois.  
Dinner—M. S. C. Union  
Movie "Heat"—Johns-Manville  
"Insulation"—W. W. Cullin, Johns-Manville

#### Tuesday, March 28 (Morning)

111 Olds Hall—"Selection, Installation and Regulation of Fans"—Fred Bishop, Detroit.

#### (Afternoon)

111 Olds Hall—"Accurate Rating and Proper Baffling of Heating Units"—L. G. Miller, Michigan State College

#### Wednesday, March 29 (Morning)

111 Olds Hall—"Buying, Locating and Adjusting Controls," Jim Woodson, Detroit Contractor

#### (Afternoon)

"Comparison of Combustion of Oil and Coal Automatically Fired"—111 Olds Hall, Hayes

#### (Evening)

Banquet—Joint meeting of Michigan and Western Michigan Chapters A.S.H.&V.E. with Eighth Annual Forced Warm Air Conference

#### Thursday, March 30 (Morning)

111 Olds Hall—"Methods of Estimating Costs of Forced Warm Air Heating Systems"—Ed Root, Nelson Co., Detroit.

#### (Afternoon)

111 Olds Hall—"Selling the Job"—Bruce McLouth, Dail Steel Products, Lansing.

### PROGRAM FOR BEGINNERS

#### Monday, March 27 (Afternoon)

Explanation of Plans and Methods  
"Heat Losses"

#### Tuesday, March 28

"C. F. M. Requirements"  
"The Layout"

#### Wednesday, March 29

"Duct Friction"  
"Duct Design"

#### Thursday, March 30

"Balancing"

### PROGRAM FOR ADVANCE STUDENTS

Heating or Cooling a Residence With Same Duct System

#### Monday, March 27

Review Duct Design in Technical Code. Locate flow and return outlets and make preliminary C. F. M. calculations and duct layout.

#### Tuesday, March 28

Study friction loss in ells, takeoffs, stackheads, transitions, etc., and size duct work.  
Complete ductwork calculations and size and select blower and filters.

#### Wednesday, March 29

Study sources and amounts of heat gain. Calculate heat

gain of Plan B.

Complete heat gain calculations. Sum up total load and zone the job.

#### Thursday, March 30

Considering the capacity of installed duct system and cooling medium, select cooling coils and refrigeration.

## University of Illinois Conference

The University of Illinois, Urbana, announces the 1939 Conference on Air Conditioning, sponsored by the Department of Mechanical Engineering and the Engineering Experiment Station of the College of Engineering, University of Illinois, Urbana, Illinois.

The dates—March 8 and 9, 1939.

The purpose of the conference is to present technical information on current problems and apparatus involved in small and medium size all-year comfort air conditioning installations, in as non-technical a manner as is possible, in order to serve the dealer, installer, owner, and prospective owner of air conditioning equipment. The papers to be presented will cover modern equipment, design of duct systems and selection of fans, air distribution in spaces, regulation of air temperature and humidity, physiological information, refrigeration and condensation problems, insulation types and applications, and water supply, conservation, and disposal problems. The air conditioning equipment in the laboratories of the University will be available for inspection at convenient periods following the afternoon sessions.

There will be no charge for either registration or attendance, and the price of the dinner meeting to be held on March 8, 1939, will be nominal.

Complete programs and information will be mailed upon request made to Professor W. H. Severns, Chairman, General Committee, 1939 Conference on Air Conditioning, University of Illinois, Urbana, Illinois.

## Oregon Air Conditioning Conference

Announcement is made of the tentative program of the second Oregon State Air Conditioning Conference to be held March 23, 24, 25 at Oregon State College, Corvallis, Oregon. The tentative program follows—

#### Thursday, March 23

##### REGISTRATION

9:00 a. m. to 12:00 Noon.

##### FIRST GENERAL SESSION (Afternoon)

Welcome by Dean  
Discussion of Program by E. C. Willey  
Trends in Air Conditioning  
Selling Air Conditioning (Symposium)  
Principles of Selling  
Estimating Piping and Central Plants  
Estimating Sheet Metal Work  
Estimating Furnace Installation

##### FIRST SEMI-TECHNICAL SESSION (Evening)

Air Conditioning for Health and Comfort

#### Friday, March 24

##### SECOND SEMI-TECHNICAL SESSION (Morning)

Types of Heating Systems  
Design of Warm Air Heating Systems

##### FIRST TECHNICAL SESSION (Morning)

Combustion  
Cooling Loads and Methods

##### THIRD SEMI-TECHNICAL SESSION (Afternoon)

Design of Air Systems  
Inspection of Exhibits

##### SECOND TECHNICAL SESSION (Afternoon)

Tests for Combustion and Efficiency  
Inspection of Exhibits

(Continued on page 138)

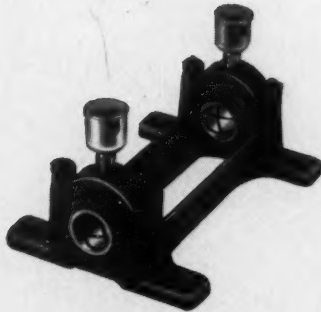


# The *Randall* Line for '39

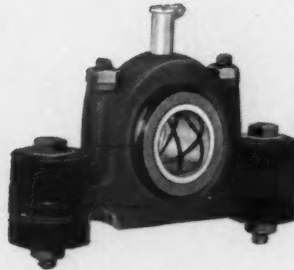
**NEW TYPES • MORE IMPROVEMENTS • LOWER PRICES**



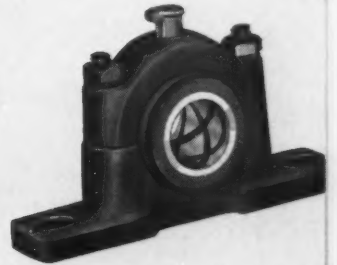
Cut-away section of single reservoir ball for Standard, Rubber Mounted and Duplex Pillow Blocks



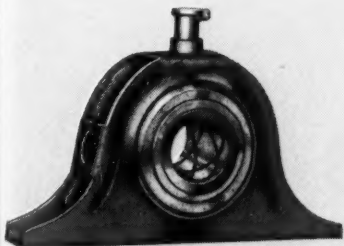
Duplex Standard Pillow Block (New)



Rubber Mounted Pillow Block



Standard Pillow Block



One-Piece Steel Housing Pillow Block (New). Mounts in any position.



Cut-away section of single reservoir ball for One-Piece Steel Housing Pillow Block. (Has increased oil capacity)

**A** GAIN this year as in previous years, most manufacturers of air conditioning equipment have specified Randall Pillow Blocks for their new units. They give exceptionally long, trouble-free service, and manufacturers have learned this through experience.

Two new units have been perfected. The One-Piece Steel Housing Pillow Block which is offered at the lowest price in our history, is as quiet and durable for normal duty applications as any Randall Pillow Block and is interchangeable with them in the same shaft sizes from  $\frac{1}{2}$ " to 1".

The new Duplex Standard Pillow Block overcomes vibration in attic fan applications by combining two Standard

Pillow Block bases cast integrally which provides a strong rigid one-piece base that will not distort yet permits full alignment of the shaft at all times.

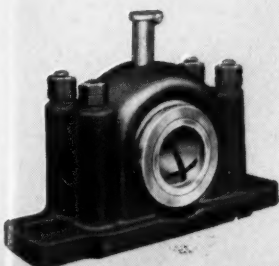
Over a half million Randall Pillow Blocks in use are evidence of their continuous satisfactory service.

Specify Randalls for 1939. If you are buying air conditioning or furnace blowers be sure they are equipped with Randall Pillow Blocks to assure long, care-free life in the field.

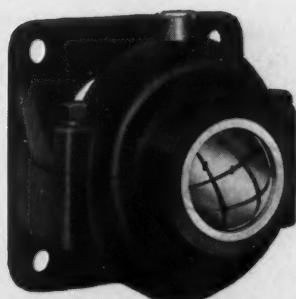
Write for new 1939 Randall catalog which describes in detail our complete line. Advise shaft sizes and requirements and we will be pleased to quote latest prices which have all been reduced except on large sizes.

**RANDALL GRAPHITE PRODUCTS CORPORATION**

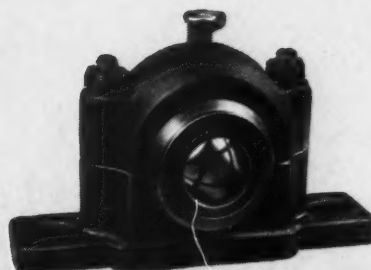
**609 W. Lake St. - Dept. J-39 - Chicago, Ill.**



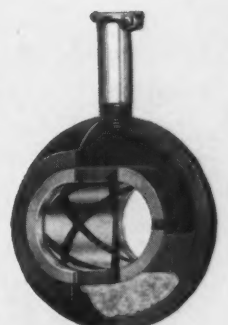
Universal Pillow Block



Flange Pillow Block



D. R. O. R. Pillow Block



Cut-away section of double reservoir ball for D. R. O. R. Uni-

# THERMO-DRIP

## Heat Regulated HUMIDIFIERS

### FOR ANY TYPE OR MAKE OF WARM AIR FURNACE

The Furnace Dealer who sells the Thermo - Drip will tell you it is—



**"The Greatest Humidifier VALUE I Ever Saw!"**

**4 PAN SIZES FIT MAJORITY OF JOBS**



No. 21S—34"x8" No. 15S—24"x8"  
No. 16S—34"x6" No. 14S—24"x6"

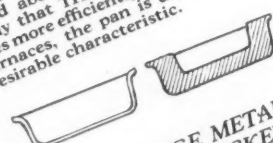
... AND 6 OTHER STANDARD SIZES ALSO ARE AVAILABLE

**2 REASONS WHY THERMO-DRIP IS MORE EFFICIENT**



**A THIN LAYER OF WATER EVAPORATES FASTER**

In operation, THERMO-DRIP maintains scarcely more than a sheath of water over the evaporating surface of the pan. The sauce pan demonstration indicates that THERMO-DRIP operates more efficiently. And in cold furnaces, the pan is dry—a very desirable characteristic.



**LIGHT GAUGE METAL PANS HEAT QUICKER**

Greater humidifier efficiency goes hand-in-hand with pans thin enough to heat quickly. Especially important in gas or oil-firing with its on-and-off system action, and in forced air systems with their low bonnet temperatures. Compare THERMO-DRIP's 24-gauge stainless steel pan with heavy, rustable metal pans of ordinary humidifiers.

SOME MIGHT consider an air moistener "good enough" even though it were only a mechanism to relieve them of the manual task of pouring a bucketful of water into the furnace water receptacle. But not after they discover that, at practically the same cost as the mechanism, the THERMO-DRIP Humidifier gives them controlled moisture.

You will find it surprisingly easy to sell more humidifiers when you tell furnace operators the advantages THERMO-DRIP gives them . . . when you tell them it is the most simple, attention-free, automatic humidity control they can buy. The moisture it adds to the heated air is constantly in balance with the heat output of the furnace . . . because the thermostat over the pan operates the water valve in unison with temperature fluctuations in the furnace plenum. No instruments, no electric wiring, no mechanical parts are needed in the entire installation! And your prospects will readily agree with you when you tell them a wafer-thin layer of water evaporates faster than a panful of water. THERMO-DRIP's combination of the modulated water drip and the quickest heating vapor pan allows no more than a film of water to cover the bottom of the pan.

Installed without Dismantling or Shutting Down the Furnace

Tie in with these powerful selling features. Sell THERMO-DRIP Humidifiers—they will pay you prompt dividends in cash and prestige throughout 1939.

Write for Complete Detailed Information

**AUTOMATIC HUMIDIFIER CO.**

18th and Main Streets

CEDAR FALLS, IOWA



**STAINLESS STEEL**

*gives Thermo-Drip Pans Longer Life*

# National Warm Air Ass'n

## Celebrates Silver Anniversary

**T**HE National Warm Air Heating & Air Conditioning Association celebrated its silver anniversary on December 12th, 13th and 14th in Cincinnati. The convention was one of the largest, if not the largest, in the history of the organization, the attendance being officially estimated at approximately five hundred persons.

### Past Presidents Honored

In celebration of the Association's Silver Anniversary, twenty-five candles in five silver candelabra were lighted in front of the speakers' platform at the opening session. Seated behind the candles were the following past presidents, all of whom gave brief summaries of their administration: W. G. Wise, 1918-21; Irving L. Jones, 1921-23, 1931-32; W. L. McGrath, 1932-34; H. T. Richardson, 1934-36; W. L. Rybolt, 1936-1938. Letters were read from absent past presidents, D. R. Richardson, President 1917-1918, and E. B. Langenberg, 1923-27. In turn, each of the present past presidents briefly outlined the highlights of their tenure in office. W. G. Wise said the first three years were devoted primarily to the organization of the association and the first agitation for a research program was begun during his term of office.

I. L. Jones declared that his terms of office were a period of hot debate. Rating formulas, codes, the first reports from the research program, all caused vigorous argument and debate. E. B. Langenberg sent a letter declaring that in his estimation the value and benefit of the Association have only started and that close adherence to past standards will keep the Association free of troubles of price cutting, poor standards, etc.

W. L. McGrath felt that during his term warm air heating became a true science, and that we then got our first inkling that our research program was being built beyond the imagination of those who first sponsored the program. H. T. Richardson declared that everyone present should pay tribute to the service of past presidents and all of the committees which served under them and that he confidently expected the Association to move forward in the next few years.

W. L. Rybolt said every active member should put his shoulder to the wheel to further the intents of the Association. Outstanding in Mr. Rybolt's opinion, was the formation of the three codes now covering all types of installations.

### President Taylor's Address

Declaring that the association could not hope adequately to acknowledge its indebtedness to past officers, committees and the research staff, President Taylor said he believes the organization is standing on the threshold of greater accomplishments if we keep bright the tools handed down from past workers. One pressing problem, in the president's opinion, is the need to gather within the association every manufacturer, jobber, and contractors if possible, in any way identified with warm air heating.

Only through the services of a man hired specifically to stimulate membership by personal contact can this membership be increased, said President Taylor, and announced that such a man had been hired and would be presented.

"Ask Them to Buy" was a slogan which brought favorable reaction so, said Mr. Taylor, this organization might adopt a slogan similar—"Ask Them to Join." Because membership is not expensive, because membership is definitely valuable and profitable, the drive should progress, declared the speaker, and asked each member to be an assistant solicitor.

### Cooperative Management

One of the outstanding addresses of the meeting was that of C. T. McCormick, widely recognized as one of the pioneers of multiple management. Mr. McCormick's plan has been presented in many foreign countries, as well as throughout the United States, and he began his discussion by declaring that the trouble with most present day industrialists is that they have taken a licking lying down. "Present day employers have been too afraid of employees and the attitude of the public. I believe every industrialist has a positive right to tell employees what the employer thinks about governmental policies, as well as business policies. Too many employers become artificial when they get the least bit prosperous. Many of the troubles other countries have had with forms of socialism can be traced directly to the fact that the masses were not satisfied and did not understand the problems of those who paid them wages.

"I believe that outright inheritance of ownership and management of American businesses generally leads to serious trouble. No man has a right to inherit a going enterprise unless he demonstrates his ability to properly conduct that enterprise. A one man business is generally dangerous because



few men can have or understand all details of management."

Mr. McCormick then briefly sketched the set-up of his multiple management plan as applied to his own business of McCormick & Company, Incorporated, and explained how the various executive, factory, junior and sales boards meet to solve their own problems and all meet together to solve the principal problems of multiple management. A highlight of Mr. McCormick's address was his statement that multiple management in its first year reduced factory costs twelve per cent. Also, that under the present form of operation every individual in the company is guaranteed forty-eight weeks of work a year; something all American business is working to, in the judgment of Mr. McCormick. Mr. McCormick emphasized that every employer can guarantee his employees some amount of work during the year, even though it may only be five weeks and the most important thing this employer can do is to tell the employee exactly how much work he expects to give the employee in the year. This would eliminate much of the trouble of employees obligating themselves for things they cannot pay for, and would give every employee some idea as to what income he might reasonably expect.

#### The Publicity Program

In reporting on the association publicity campaign, A. P. Ames outlined the scope of the campaign as reported several months ago in *American Artisan* and declared that the key to the campaign is "comfortable homes." He reported that one hundred and thirteen radio stations have asked for free talks to be delivered on heating and that these stations represent approximately twenty millions of listeners. About two thousand newspapers are receiving releases by request and approximately two hundred papers have used one release describing the "dream house." Mr. Ames suggested that an immediate necessity is some sort of an association booklet covering the fundamentals of warm air heating; this booklet to be given to architects, home owners, builders, and any others interested in heating and winter air conditioning. Mr. Ames also emphasized that the Association expects to co-operate with other allied industries, such as the gas industry, insulation industry, different fuel organizations and others.

Another immediate necessity, according to the speaker, is some type of educational campaign for dealers to be passed to the dealers through the manufacturers and the manufacturers' salesmen. A bulletin entitled "Temperature Tips" was mentioned as having been printed and mailed to one thousand daily newspapers and two hundred general magazines. This bulletin will be issued once a month hereafter and will be devoted mainly to the subject of heating economy. This theme was chosen because the Association feels it will be of interest to every householder. Later issues of "Temperature Tips" will stress the superiority of warm air heating. The Publicity Committee has advised all newspapers and magazines that requests for information received from readers may be forwarded to the New York office, where answers will be provided for

publication or direct to the inquirer.

H. T. Richardson, as Chairman of the Publicity Committee, briefly mentioned some of the problems of collecting sufficient money to launch the campaign and to carry it along, and declared that sufficient money has been received to enable the program to operate until the middle part of 1939. Mr. Richardson declared he believes everyone should know who has subscribed to this campaign and for this purpose presented the list of subscribers to the convention. This list is as follows:

#### Supporters of the Publicity Campaign

Reported at Cincinnati Convention December 14, 1938

Acer & Whedon, Inc., Medina, N. Y.  
Agricola Furnace Co., Gadsden, Ala.  
Air Controls, Inc., Cleveland, O.  
American Foundry & Furnace Co., Bloomington, Ill.  
Armstrong Co., Detroit, Mich.  
Armstrong Furnace Co., Columbus, O.  
Auer Register Co., Cleveland, O.  
Automatic Humidifier Co., Cedar Falls, Ia.  
Brundage Co., Kalamazoo, Mich.  
Chicago Furnace Supply Co., Chicago, Ill.  
Crise Electric Co., Mt. Vernon, O.  
Doermann-Roehrer Co., Cincinnati, O.  
Dowagiac Steel Furnace Co., Dowagiac, Mich.  
Excelsior Steel Furnace Co., Chicago, Ill.  
Faultless Heater Corp., Cleveland, O.  
Forest City Foundries Co., Cleveland, O.  
Fox Furnace Div. of the Am. Rad. Co., Elyria, O.  
Furblo Co., Hermansville, Mich.  
Grant Totten, Inc., Canton, O.  
Green Foundry & Furnace Works, Des Moines, Ia.  
Hall-Neal Furnace Co., Indianapolis, Ind.  
Hart & Cooley Manufacturing Co., Chicago, Ill.  
Henry Furnace & Foundry Co., Cleveland, O.  
Home Furnace Co., Holland, Mich.  
Homer Furnace & Foundry Corp., Coldwater, Mich.  
Independent Register Co., Cleveland, O.  
International Heater Co., Utica, N. Y.  
John E. Jackson, Newcastle, Pa.  
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.  
Lau Blower Co., Dayton, O.  
Lennox Furnace Co., Inc., Syracuse, N. Y.  
Lamneck Products, Inc., Columbus, O.  
Liberty Foundry Co., St. Louis, Mo.  
P. H. MaGill Foundry & Furnace Works, Bloomington, Ill.  
Majestic Co., Huntington, Ind.  
Marshall Furnace Co., Marshall, Mich.  
F. Meyer & Bro. Co., Peoria, Ill.  
Michigan Tank & Furnace Corp., Detroit, Mich.  
Montag Stove & Furnace Works, Portland, Ore.  
L. J. Mueller Furnace Co., Milwaukee, Wis.  
Owens-Corning Fiberglas Corp., Toledo, O.  
Pecora Paint Co., Philadelphia, Pa.  
Peerless Foundry Co., Inc., Indianapolis, Ind.  
George F. Pettinos, Inc., Philadelphia, Pa.  
Premier Furnace Co., Dowagiac, Mich.  
Register & Grille Manufacturing Co., Brooklyn, N. Y.  
Richardson & Boynton Co., N. Y. C.  
Rock Island Register Co., Rock Island, Ill.  
Round Oak Co., Dowagiac, Mich.  
Rudy Furnace Co., Dowagiac, Mich.  
Rybolt Heater Co., Ashland, O.  
St. Louis Furnace Mfg. Co., St. Louis, Mo.  
Security Stove & Mfg. Co., Kansas City, Mo.  
Semet-Solvay Co., N. Y. C.  
Standard Furnace & Supply Co., Omaha, Neb.  
United States Register Co., Battle Creek, Mich.  
Universal Cooler Corp., Detroit, Mich.  
Ward Machinery Co., Chicago, Ill.  
Waterloo Register Co., Waterloo, Ia.  
Waterman-Waterbury Co., Minneapolis, Minn.  
Williamson Heater Co., Cincinnati, O.  
Grant Wilson, Inc., Chicago, Ill.  
Wise Furnace Co., Akron, O.

#### New Business Activities

Presiding at the first afternoon session, Vice President C. A. Olsen, declared that during the past year we have witnessed a rebirth of business. For-

merly manufacturers were overstocked and sales were slow; today building is increasing, sales are jumping, and more optimism is in evidence than in any similar period in recent years. Mr. Olsen declared that the new publicity campaign would be far reaching in effect and that the hiring of an outside man to contact manufacturers was a move long needed and from which much benefit should be derived. This "Assistant to the President" is William E. Darden, of New York, who will spend most of his time calling on the trade, building up membership, and advising with manufacturers and distributors in the interest of the industry. His offices will be at the Association's Information Bureau, 11 West 42nd Street, New York City. Mr. Darden, thus introduced, declared that he believes that the Association has an excellent opportunity to expand and to enjoy increasingly better prospects during the next ten years. He asked the co-operation of all members of the Association and prospective members.

#### **Prefabricated Ducts**

Perl S. Miller, speaking on "Standardization and Use of Pre-Fabricated Ducts," declared that air conditioning ducts have been the bottle neck in the development of residential air conditioning. Some of the reasons why standardization may be expected to advance are that everyone is interested in better appearance; every manufacturer and engineer wants his jobs installed according to his plans and only as the duct work follows the plans can they be sure that the job will be according to plans. The manufacturer of pre-fabricated ducts today is using research work to provide ducts which will meet all present day engineering requirements, and Mr. Miller declared that while he had no argument with tailor-made pipe work he did believe that there is a very definite place for pre-fabricated duct work in the present scheme of operation. Another advantage, according to the speaker, is that pre-fabricated duct work sets a definite price before the job is bid and there should, therefore, be fewer losses on the pipe work. The time will come, in the judgment of the speaker, when the furnace manufacturer will sell a complete system, including all pipe work, directly to the dealer, and this will enable the contractor to spend more time in selling and management.

C. Ackerson, Chairman, Resolutions Committee, read an Association Memorial Resolution to the late Professor J. D. Hoffman, and the Association paid tribute to Professor Hoffman by standing for one minute of silence.

#### **Code Committee Report**

B. F. McLouth, Chairman of the Codes Committee, outlined recent activities of the Codes Committee and pointed out that the three codes have recently been revamped and revised and are now available in a new dress. The principal changes are that the standard code, Table A, has been revised to correspond with the Table in the technical code. The Practical Code has been changed as to register temperature and Table A, and also conforms now

with the Technical Code. In the Technical Code changes have been made in Tables 3 and 9 and heat loss co-efficients have been revised to correspond with the latest edition of the ASH&VE Guide. The regular prices for single copies are Standard Gravity Code, 25c; Practical Mechanical Code, 25c, and Technical Mechanical Code, 50c. These three Codes in their present revised form cover every type of residential warm air heating or residential air conditioning from the simple gravity job to the most complicated mechanical installation involving cooling.

#### **New Book on Forced Air**

The new book, "Forced Air Heating" was introduced by J. D. Wilder, who announced that the book was not yet off the press, but would be available shortly after the first of the year and, without having any copies available, read the thirty-two chapter headings of the book. This book has been written by Professor Konzo, of the University of Illinois, and covers practically every problem related to mechanical warm air heating. The price of the book will be three dollars for single copy and books may be purchased from all the trade paper publishers and directly from the Association. Literature describing the new book has been printed by the publisher and may be obtained from this magazine or from the Association headquarters in Columbus.

#### **"Contented Customers"**

A. W. Wrieden, speaking on "Contented Customers," declared that such customers are as necessary to the furnace man as to the hotel proprietor, and that, unfortunately, too many dealers never take the time to call back on old customers. He suggested three such calls on old customers every day to inspect furnaces, offer a cleaning service, clean out the ash-pits, explain to the home owner how to properly fire the furnace, and by such means thus place the home owner under obligation to the dealer. "Some dealers say," declared Mr. Wrieden, "that there are too many headaches and complaints already, but I say that if there are such complaints these should be rectified immediately, as they do not improve with age. Don't try to run away from complaints because they will always catch up with you. Try to live up to your promises. Explain thoroughly and personally everything connected with the operation of the system you install. Temporary repairs, in my opinion, too often lead only to future trouble, and it will be easier and there will be more satisfaction to you and to the owner if you will attempt to sell him a complete new heating system. More people buy quality today than cheap or shoddy merchandise despite all data to the contrary and I believe that the quality merchandise dealer will be in business long after the cheap operator has gone away."

#### **FHA Relations Committee**

J. E. Maynard, Chairman of the FHA Relations Committee, reported the progress made from the inception of the Committee's work up until the pres-



ent time. He explained how the Committee, composed of himself as Chairman; Professor J. D. Hoffman, of Purdue University; C. W. Nessel, of the Minneapolis-Honeywell Company, and Professor Miller of Michigan State University, succeeding Professor Hoffman, had met with FHA and prepared a preliminary draft of suggested equipment specifications for the FHA. Mr. Maynard described the long conferences held with FHA officials and the various problems which had been presented. In Mr. Maynard's opinion, the Committee has in no way discriminated against the product of any one manufacturer, but as a result of these conferences it was generally conceded that there are some practices which should be eliminated, such as under-sized fans and over-rated furnaces, fire hazards from filters being placed too close to hot surfaces, too light weight metal used in critical portions of the furnace construction, and several complications connected with oil, gas, or stoker firing units. Mr. Maynard declared that the Committee has presented its report to the Board of Directors, and that the recommendations of the Committee had, for the time being, been held in abeyance pending final decision on the form of the Code to be presented to FHA by the Board of Directors of the Association.

#### Research Advisory Report

A report rendered by Frank Meyer, of the Research Advisory Committee, declared that more advancement has been made in heating equipment and heating design since 1930 than in all previous periods. Research, according to the Research Committee, has progressed through three distinct stages. The first, a preliminary stage in which sporadic and widely separated investigations were correlated and brought together; stage two in which this correlated work was finally placed in such rotation that very definite research results might be obtained; and the final stage three, which began with the inauguration of the present research program and the construction of the warm air residence, culminating in the present research program which proposes to investigate the following things:

One—A laboratory investigation of heat losses from ducts. Two—A laboratory investigation of pressure losses through registers and grilles. Three—Research residence studies of stoker firing. Four—Summer cooling, including cooling by water. Five—Increased co-operation with ASH&VE and the University of Minnesota on such common problems as insulation, etc.

#### Research Residence Cooling

Professor A. P. Kratz, speaking on Resistances in Duct Work, went back to some very fundamental principles of velocity pressure, static pressure, and total pressure, showed how these different pressures are related and how these various pressures are read with draft gauges, or other instruments. He pointed out, as Professor Konzo has done in *AMERICAN ARTISAN*, how dangerous it is to read static pressure losses in duct systems, excepting where the duct section read is of uniform section for a considerable

length. He pointed out that total pressure is the true indication of conditions within any section of a complicated duct and most frequently is the only reliable reading which may be obtained.

An interesting comment of Professor Kratz' was to the effect that fan manufacturers frequently rate fans on their delivery on the pressure side of the system only and completely disregarded the resistance which is set up when the fan is connected into the system and must also operate against the static resistance of the return side of the piping system. Professor Kratz suggested that all fans should be rated "in place" and not according to a laboratory test which considers only the delivery side of the fan. Professor Kratz showed some of the tables presented in the January, 1938, issue of *AMERICAN ARTISAN* giving the resistances of common fittings in terms of lengths of equivalent straight pipe.

#### Resistances in Ducts

Professor S. Konzo, discussing cooling research, emphasized those tests conducted with a condensing unit rated at sixty per cent of the total 30,000 Btu required capacity for cooling the research residence. He pointed out that in the research residence investigators found that 74 to 75 degrees effective temperature was the critical point. Anything above 75 was not satisfactory.

Using the under-sized compressor it was found that on an average summer day the unit started operating at approximately noon and ran continuously until about nine in the evening. During this time the dry bulb temperature rose gradually, but did not exceed 80 degrees at 60 per cent relative humidity. It was discovered that night air cooling, employing fans, helps considerably in making the under-sized compressor satisfactory. Professor Konzo showed how the heat lag ran about two hours behind the peak outdoor temperature, but excepting for one or two very hot days this small unit was satisfactory. He suggested that before contractors decide always to use under-sized condensers they study the results published in Bulletin 305.

Professor Konzo also described a series of tests wherein all of the cool air was introduced in the second story on the idea that the cool air would work to the first floor. It was found that relative humidity and dry bulb temperatures on both floors were fairly satisfactory, but that air conditions on the first floor were "dead" and not as good as the second story; nor was the effectiveness of cleaning quite so good. These results also appeared when a full sized condensing unit was operated the same way. Another series of tests covered zone cooling wherein the first floor was cooled during the daytime and the second floor was cooled at night, but the test disclosed that it required approximately three hours to drop the second floor temperature a very few degrees. With the 30,000 Btu capacity condenser it was possible to drop the second floor temperature in approximately one and one-half hours, but in neither case was the condition inside the residence quite so good as with other cycles of

(Continued on page 150)





# WHITNEY-JENSEN's Newest Machine -

## The SUPER-EDGER

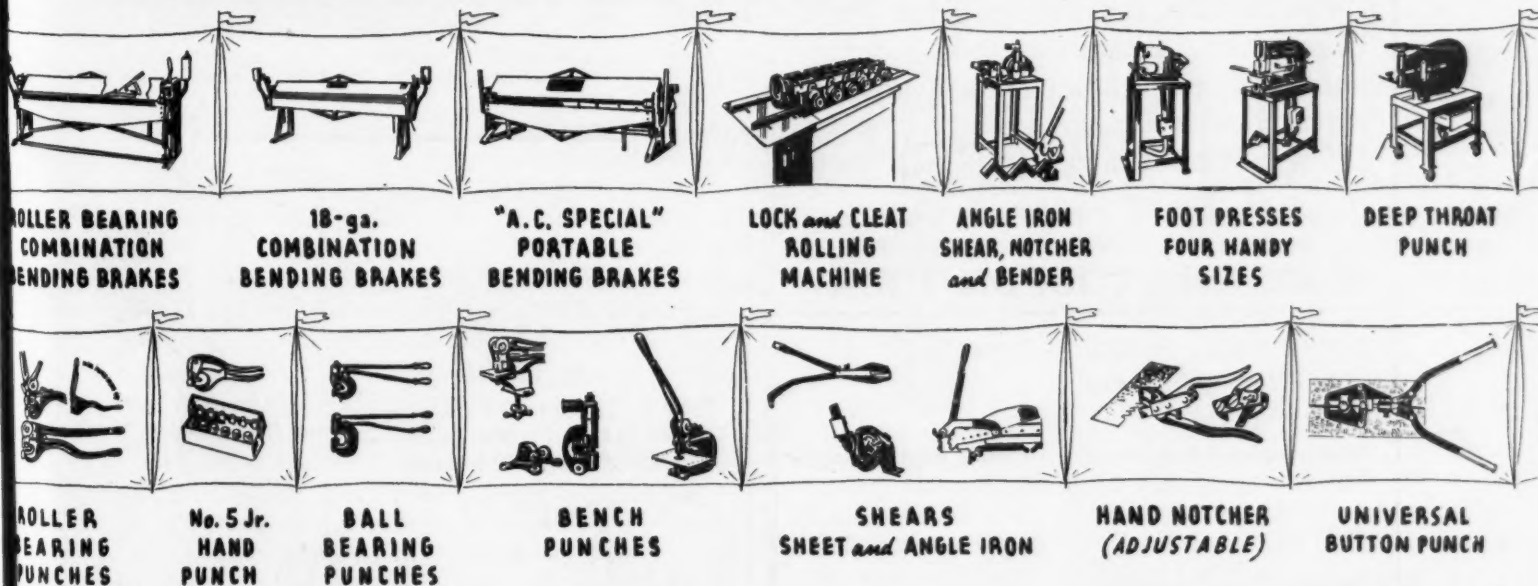
- ★ HAMMER TYPE
- ★ SELF STARTING



**H**ERE, GENTLEMEN, is an amazing new tool which turns a 90° edge of any depth up to  $\frac{5}{8}$ " by a *drawing* action that FLOWS the metal to shape, rather than crimping it. A reciprocating hammer with a round-nose rotating head bends up the rim against a hardened anvil roller. A ratchet-operated, adjustable, synchronized feed roll moves the work slightly between hammer blows (800 per minute) to produce a perfectly smooth piece of work with almost no radius at the bend. The operation requires no hand crimp for starting, as the flat sheet can be slid into working position at any point. Variety of shapes that can be handled is almost limitless. WRITE TODAY for further information.



AND A COLOSSAL SIDE SHOW OF THE  
GREATEST COLLECTION OF SHEET METAL  
WORKING TOOLS NOW AVAILABLE FROM A SINGLE SOURCE



... and many others!

# WHITNEY METAL TOOL CO.

97 FORBES ST.  
ROCKFORD, ILLINOIS



## USE PYROLITE PRODUCTS FOR PERFECT SATISFACTION

Nu-Dry Furnace Cement is a new type cement, ideal for winter jobs, because it makes a GASKET between the castings that will not crack, powder or bloat when furnace is FIRED IMMEDIATELY AFTER THE CEMENT IS APPLIED. It will not shrink, keeps tight joints at all times and is not affected by temperature changes. There is no loss because it comes to you in dry form.

Radolite Asbestos Furnace Cement is a plastic type furnace cement that is easily applied and sets faster than most similar products. This allows furnaces to be fired within twenty-four hours after cement is applied.

Pyrolite Ready Mixed Aluminum Paint gives an extra bright and extra smooth, silvery finish, waterproof and heatproof. Ideal for radiators, pipes, furnaces, boilers, heaters and all interior and exterior metal surfaces. Comes ready mixed and always gives a bright, silvery finish even after long standing in the package.

Pyrolite Heat Resisting Black Paint protects and preserves metal surfaces subjected to extreme heat such as stacks, boilers, furnace fronts, pipes, etc. Dries with a black glossy finish and will not crack, peel or blister.

### MAIL THIS COUPON TODAY

**THE PYROLITE PRODUCTS COMPANY**  
1221-31 West 74th Street  
Cleveland, Ohio

Send complete information about Pyrolite Heat Resisting Products:

Name .....

Address .....

## Fort Wayne Ordinance

(Continued from page 75)

must comply. We have a far greater percentage in favor of our code and feel sure, therefore, that our code will bring about its ultimate possibilities.

We have divided the types of work done into seven classifications. These are—Gravity Warm Air Heating, Mechanical Warm Air Heating, Air Conditioning, Oil Burners, Natural and Artificial Gas Burners, Stokers, Sheet Metal Work.

### TYPICAL QUESTIONNAIRE FOR OIL BURNER INSTALLATION EXAMINATION

1. What is atomization? (Define.)
2. What is combustion? (Define.)
3. Name different types of oil burners.
4. What types are most generally used for domestic installations?
5. What types are most generally used for industrial installations?
6. How is oil burned? (Define different methods.)
7. What is accepted for combustion chambers and how are they constructed?
8. Who has authority over oil burner installations?
9. What size "fill" pipe required?
10. What size "vent" pipe required?
11. How is size of oil burner determined for different types of installation—warm air—steam—hot water—vapor?
12. How many B.T.U. output per sq. ft. standing steam, and hot water radiation?
13. What is accepted standard B.T.U. value of No. 1, No. 2, No. 3 oils respectively?
14. What grade of oil is most suitable for the different types of oil burner?
15. Is factory training essential for installation and service men on oil burners? Why?
16. Are foot valves essential in all oil storage tanks on the suction stub? If so, why? If not, why?
17. What is accepted pressure at the nozzle for the pressure type oil burner?
18. Is a positive shut off valve to stop the flow of oil when motor stops necessary on any oil burner? If so, what type and why?
19. What is accepted standard method (generally speaking) of determining combustion chamber size for furnaces or boilers?
20. How many square feet of steam radiation will one gallon of oil handle (approximate)? Square feet of hot water radiation?
21. Are automatic water feeders and low water cut off valves necessary for boilers using oil as fuel? Why?
22. What is a limit control, and where are they used and why?
23. Define different types of limit controls and state where each is used.
24. What is general height for thermostat location?
25. Are thermostats of the low voltage or line voltage type?
26. What type most commonly used and why?
27. Would you recommend a valve (type) in return line from oil burner to storage tank? Why?
28. What is the difference between a surface aquastat and an immersion type? Where should each be used?
29. Are instruments necessary to adjust an oil burner so as to get its utmost efficiency? What instruments are required, and are you familiar with their use?
30. Do you think (generally speaking) that oil burners should be serviced by the oil companies, who do not install them, and give your reasons?

To do work under any one of these classifications requires a license for that classification. To do work in two, or three, or more classifications requires a license for each classification. Thus a contractor may be licensed to do only gravity warm air heating; another may be licensed for seven classifications. If a man holds a license to sell stokers, for example, and sells a furnace, someone holding a furnace license must take out the permit for the furnace and install the furnace. Men, *not firms*, hold licenses.

To obtain a license in any given classification, the licensee must take an examination. He must also fill out a general questionnaire which we believe gives preference to the man with experience, a shop, tools, and a satisfactory background. The questions asked for a

# ROCK ISLAND REGISTERS

Every type . . . every kind . . . to meet every requirement and taste. Rock Island Registers combine beauty, efficiency and durability. They are extremely easy to install, and are priced so that you may realize a good profit from each installation. Rock Island is the register that can build your sales. Learn more about them . . . write at once.



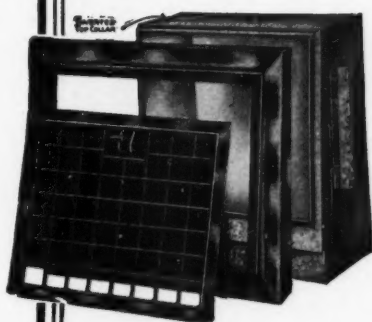
**AIR-VANE REG-  
ISTERS, FACES  
AND GRILLES**

Forced Circulation Reg-  
isters. Adjustable flow  
right or left. Also  
horizontal or vertical in  
wall or base types, all  
sizes.



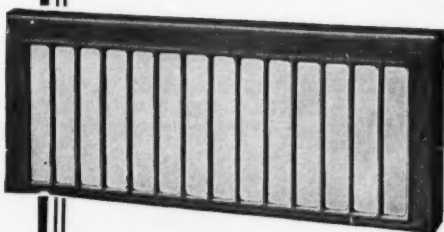
**FORCED-AIR  
ONE-PIECE  
REGISTER**

Stack Head Sizes from  
10x4 to 30x8. All at-  
tractive designs with  
large capacities, mod-  
erately priced.



**NO STREAK  
REGISTER**

Complete with Double  
Metal Head. Pipes sizes  
8 in. to 14 in.



**FORCED AIR  
BASEBOARD RE-  
TURN AIR OR  
GRILLE  
FACE**

*Write now for further information on this  
complete line.*

**ROCK ISLAND REGISTER CO.  
ROCK ISLAND ILLINOIS**

## *There's*

practically no service on a sink or  
bathtub, once installed—  
and there's little or no servicing  
on the MODERN

# BRANFORD

## OIL BURNER

*Plumbing and Heating*

*Contractors:—*

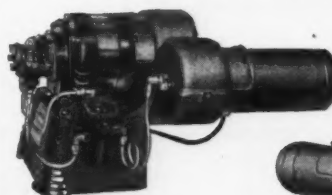
Now you can sell and install the Branford Oil  
Burner and expect it to operate with no more  
servicing than you would give a sink, a bathtub  
or any piece of heating equipment. Thousands  
of Branford installations operate year after year  
with no service.

Instead of a burden on the contractor, the Bran-  
ford FIRST, shows him a genuine profit;  
SECOND, keeps all this heating business in his  
own hands by making his own oil burner in-  
stallations. To install is made easy with Bran-  
ford's clear and simple instructions.

And when you deal with Branford you are guar-  
anteed fair treatment by an organization known  
and respected in the trade for over 75 years.

Ask for Branford franchise information and the  
booklet of oil burner comparison on coupon  
below.

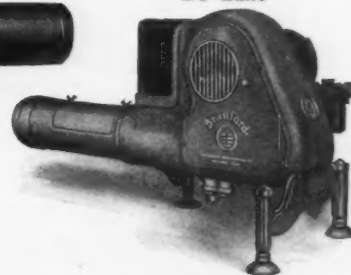
**MALLEABLE IRON FITTINGS CO.  
DEPT. 42, BRANFORD, CONN.**



MODEL F



MODEL A  
De Luxe



COMPLETE LINE, MODELS FOR ALL CAPACITIES AND INSTALLATIONS

### WHAT ARE THE DETAILS?

Malleable Iron Fittings Co., Dept. 42, Branford, Conn.  
Please send us full information and Booklet.

Name .....

Address .....



license are changed with every examination. A man failing under one set of questions cannot hope to study up on these and pass the second time. Different questions will be asked.

So far the questions in most of the examinations are based primarily upon theoretical knowledge. We must assume that the applicant knows the mechanics of his trade. If he does not, the inspection of his jobs will quickly trip him up; make him do the work correctly, or revoke his license. It is not the intent of these examinations to be so technical that only a graduate engineer can answer the questions, but we do believe that certain things must be known and we insist that applicants understand and are able to explain these fundamental laws of their trade.

#### Enterprise Is Not Stifled

We do not expect nor want to keep any good man out of business; we want to give every opportunity to the conscientious mechanic who is ambitious enough to open his own shop—but we do insist that this mechanic knows the theory which lies behind his trade. If he does not, we feel we discriminate against the man who does know his craft if we let the newcomer start in business. One or two typical examinations are shown with this article.

#### Tabulation of Permits

There is appended to this report a tabulation of permits by classification and by contractor. The contrac-

tors have been juggled so there is no sequence by alphabetical name, no order of volume of business, or grouping of license classifications. The list is published to show the wide range in volume of work by individual contractors and the variety of apparatus some contractors sell. Incidentally, the tabulation also shows how concentrated upon one piece of apparatus some firms become. It will be noted that some firms specialize on old house work; only a few concentrate on new house work. Fort Wayne is having a boom in gas burning and this accounts for the large number of gas burners sold.

## Oregon Conference

(Continued from page 128)

#### BANQUET SESSION (Evening)

Informal Stag Banquet

Address by President of Oregon State College

Address by President of A.S.H. & V.E.

Saturday, March 25

#### SECOND GENERAL SESSION (Morning)

Temperature and Humidity Control, Methods and Devices

Adjustment of Equipment and Trouble Shooting

(Symposium)

Air Systems

Steam Heating Systems

Refrigeration

Oil Burners

Gas Burners

Coal Stokers

## Make your own climate with CLIMATEMAKER air conditioning

### AUTOMATIC FORCED AIR HEATING

FOR

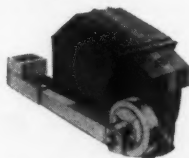
### EVERY PURSE and PURPOSE



JUNEAIRE GAS DESIGNED HEATER



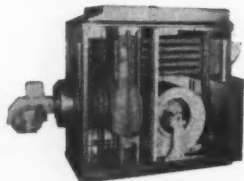
FILTERED-AIRE BLOWER WITH GRAVITY BYPASS



CLIMATEMAKER COAL STOKER DURABLE — DEPENDABLE



AMERICAN SUPER-FINPOT DURABILT HEATERS



100-J OIL DESIGNED HEATER



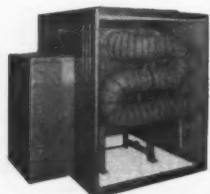
CLIMATEMAKER OIL BURNER QUIET — ECONOMICAL



CLIMATEMAKER SLIDE RULE GRAVITY & FAN CALCULATOR



LINCOLN 2600 SUPER-FINPOT DURABILT HEATERS



B & C SERIES GIANT OIL DESIGNED HEATER

### ALL HEATERS ARE CAST IRON THROUGHOUT!

Automatic forced air heating with "fuel designed" units for gas, oil and coal fuels. Exclusive dealer franchise. Close factory cooperation. Good territories are now available.

WRITE OR WIRE

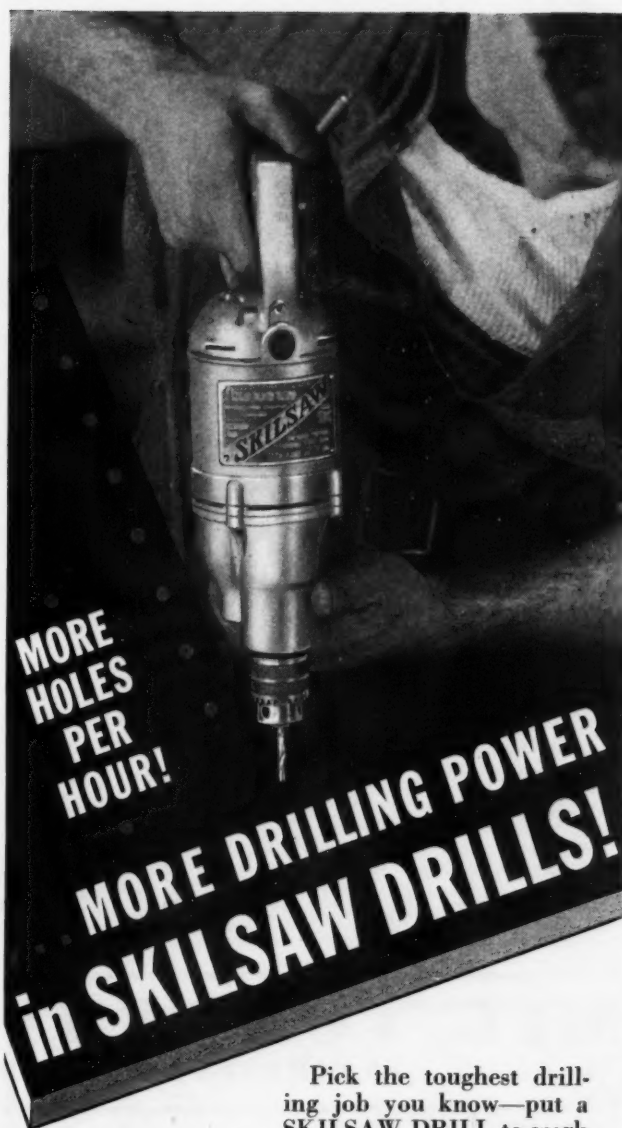
## AMERICAN FOUNDRY & FURNACE COMPANY

ESTABLISHED 1874

BLOOMINGTON, ILLINOIS



LINCOLN 2900 STANDARD FINPOT HEATERS



**MORE  
HOLES  
PER  
HOUR!**

**MORE DRILLING POWER  
in SKILSAW DRILLS!**

Pick the toughest drilling job you know—put a **SKILSAW DRILL** to work—and watch it outstrip all others in smoothness, ease of handling, drilling power and all-round performance!

There's a reason — **SKILSAW DRILLS** are *different!* They are better built . . . they do more work, save more in operation, cost less to maintain, yet *they cost no more!* Test them on your production or installation work, side-by-side with any other make, and you'll insist on **SKILSAW DRILLS** the next time you buy.

### **SKILSAW, INC.**

**4745 WINNEMAC AVENUE, CHICAGO**

214 E. 40th St., New York—52  
Brookline Ave., Boston—1429 Spring  
Garden, Philadelphia—2124 Main  
Street, Dallas—1253 South Flower  
St., Los Angeles—2065 Webster St.,  
Oakland.

• Sold by leading distributors of  
mine, mill hardware and con-  
tractors' supplies.



**21 POWERFUL  
DRILLS... a size  
for every drilling  
purpose**



## **Did You Ever Talk to This Woman?**

She is waiting to give you an order for a Cook No. 12 Heat Control.

There are a lot of women just like her. Women who need and want the greater comfort and easier, more satisfactory operation of their heating plants which they'll get with a Cook Heat Control.

And, best of all, the Cook Heat Control is easy to sell and gives you a good profit—money that you ought to have.

So talk to the women—your customers and prospects—who want the results a Cook Heat Control will give them. You'll be surprised how many of them you can sell—easily and quickly.

And you'll be surprised how much extra money you can make. It's worth your careful investigation; write today.



**SAFETY**—The Cook Control automatically checks the fire in case of power failure.

**FOR ALL THREE**—Equally effective with coke, anthracite and bituminous coal.

## **COOK CONTROLS**

THERMOSTATS—FURNACE LIMIT CONTROLS  
ZONE CONTROLS—BLOWER CONTROLS

**COOK ELECTRIC CO.**

2671 Southport Ave.

Chicago

## Survey of Price Per Opening

(Continued from page 83)

bears comment. Some bitter complaints of too low prices accompanied the reports. Checking back we find that most of these complaints came from towns where the margins of profit shown were exceedingly low. So we suggest readers study these profit columns. It is conceivable that contractors in these low profit areas cannot get higher prices because of competition, but there is one fact everyone is agreed upon, that is—there must be a profit from equipment, the metal work alone cannot carry the load.

### Volume Required When You Sell No Apparatus

This applies to the contractor who sells no equipment and only fabricates and installs for someone else who does sell the equipment, and to the contractor who sells his equipment at or near cost hoping thereby to shave his price to get the job. Some interesting figures along this line are offered by J. E. Peterson, contractor in Hinsdale, Illinois. Mr. Peterson says: "I understand that some shops in the Chicago area are offering prices of \$18 per opening plus a narrow margin on equipment. Our bid depository figured out a requirement of eight hours of labor for each opening which, at the scale of \$1.70 per hour, means a labor charge of \$13.60 without any profit on labor.

"Some contractors are bidding these same prices

where they sell no equipment. Where the contractor sells no equipment the price per opening must be stepped up if a profit is realized. For example: assume a shop can install 40 air conditioning systems a year. Whether he sells equipment or not does not alter his capacity. Assume:

40 units @ \$600 (av.) equals \$24,000.00.

Analysis per unit is:

|                      |          |
|----------------------|----------|
| Equipment cost ..... | \$200.00 |
| Labor and iron ..... | 200.00   |

|                  |          |
|------------------|----------|
| Total cost ..... | \$400.00 |
| 50% Gross .....  | 200.00   |

\$600.00

Therefore 40 units equals:

|                  |             |
|------------------|-------------|
| Total cost ..... | \$16,000.00 |
| 50% Gross .....  | 8,000.00    |

Annual Sales .....

\$24,000.00

"If we assume, on the other hand, no equipment we have:

|                      |          |
|----------------------|----------|
| Labor and iron ..... | \$200.00 |
| 50% Gross .....      | 100.00   |

\$300.00

Therefore, 40 units equals:

|                      |             |
|----------------------|-------------|
| Labor and iron ..... | \$ 8,000.00 |
| 50% Gross .....      | 4,000.00    |

Annual Sales .....

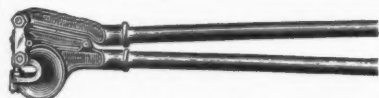
\$12,000.00

# W. A. WHITNEY MFG. COMPANY

636 RACE STREET

ROCKFORD, ILLINOIS

Look for this mark when buying



### NO. 1 HEAVY DUTY PUNCH

Length 34", weight 22 lbs., well distributed to nicely balance the tool. Capacity  $\frac{3}{8}$ " hole through  $\frac{1}{4}$ " iron. Heavily reinforced for strains. Punches and dies  $\frac{1}{8}$ " to  $\frac{3}{8}$ " by  $\frac{1}{4}$ ". Insertable Pipe Handles.



### CHANNEL IRON PUNCH

Every part of this Punch is interchangeable with the No. 2. Length 23", weight 16 $\frac{1}{2}$  lbs. Depth of throat 1 $\frac{1}{2}$ ". Capacity  $\frac{1}{4}$ " through  $\frac{1}{4}$ " iron. Punches and dies  $\frac{1}{8}$ " to  $\frac{1}{2}$ " by  $\frac{1}{4}$ ".



### NO. 6 FLANGE PUNCH

Punches within  $\frac{3}{8}$ " of inside corner of Angle Iron. Capacity  $\frac{1}{4}$ " through  $\frac{3}{8}$ " iron. Depth of throat 1 $\frac{3}{4}$ ", throat opening width  $\frac{1}{2}$ " above die top. Punches and dies  $\frac{1}{8}$ " to  $\frac{3}{8}$ " by  $\frac{1}{4}$ ". Especially adapted for Button Punching. Weight—10 lbs.

Channel  
Iron  
2 $\frac{1}{2}$ " Flange  
x  $\frac{1}{4}$ " Web.



### NO. 91 BENCH PUNCH

Capacity  $\frac{3}{8}$ " hole through  $\frac{1}{4}$ " iron,  $\frac{3}{4}$ " hole through  $\frac{3}{8}$ " iron, 2" hole through  $\frac{1}{4}$ " iron. Weight 82 lbs. Depth of throat 5". Stock size of punches and dies  $\frac{1}{8}$ " to 2".

EXTRA  
PUNCHES  
and  
DIES

Prompt shipments can be made of any size or any quantity of both types of extra punches and dies as here shown.

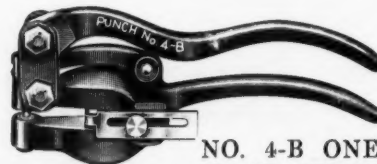


Angle  
Iron  
2 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x  
 $\frac{1}{4}$ ".



### NO. 2 PUNCH

Length 23". Capacity  $\frac{3}{8}$ " through  $\frac{1}{4}$ " iron, weight 13 lbs., depth of throat 1 $\frac{1}{4}$ ". Punches and dies  $\frac{1}{8}$ " to  $\frac{1}{2}$ " by  $\frac{1}{4}$ ".



### NO. 4-B ONE HAND PUNCH

Length 8 $\frac{1}{2}$ ". Capacity  $\frac{1}{4}$ " through 16 gauge iron. Weight 3 lbs. Depth of throat 2". Punches and dies  $\frac{1}{8}$ " to  $\frac{1}{2}$ " by  $\frac{1}{4}$ ".



### NO. 8-B PUNCH

Capacity  $\frac{1}{4}$ " hole through  $\frac{1}{8}$ " iron. Length 18 $\frac{1}{2}$ ", weight 7 $\frac{1}{2}$  lbs. Depth of throat 2". Stock size of punches  $\frac{1}{8}$ " to  $\frac{1}{4}$ " by  $\frac{1}{4}$ ".





Photographed at Delray  
Power Plant of The Detroit  
Edison Company, Detroit,  
Michigan

**2500°..24 HOURS EVERY DAY**  
*and* **THARCO** *Asbestos* **STANDS IT!**  
FURNACE CEMENT



It takes a tough furnace cement to stand up under the withering heat in the boilers of Detroit Edison's huge Delray Power Plant. Any but the best is broken down by the intensity of their 2500° fires. Tharco stays on the job only because it is made of the finest ingredients obtainable, correctly compounded to make it indestructible. It's the same Tharco you use on furnace jobs—plastic, easy to apply, fire and acid proof. Tharco will not shrink.

Write for Free Sample Can

MANUFACTURED ONLY BY  
**THE ARMSTRONG COMPANY**  
DETROIT DALLAS CHICAGO  
OUTSTANDING PRODUCTS FOR MORE THAN 25 YEARS

## THE S. T. JOHNSON COMPANY

*pioneer manufacturers of high quality Oil Burners*

announces a NEW

### 'BANKHEAT' Model BURNER

**of the Pressure  
Atomizer Type**

*improved in design and efficiency  
... at an amazingly low price*



- Built to Johnson standards, this new model has been designed for installation in almost all available boiler bases.
- Underwriters' listed, with complete set of controls, room thermostat, master control and boiler or furnace limit control.
- Firing assembly and fan easily accessible. High tension transformer connection to ignition cable completely enclosed within burner.

*Data sheets on request*

BANKHEAT Pressure Type Burners now available in capacities from .8 to 7½ gals. per hr.

*{Choice territories and Johnson franchises available}*



## S. T. JOHNSON CO.

940 ARLINGTON, OAKLAND, CALIFORNIA

401 N. BROAD STREET, PHILADELPHIA, PA.

*Distributors and dealers in principal cities throughout the world*

**THERE'S A JOHNSON OIL BURNER FOR EVERY PURPOSE**

# DUX-SULATION

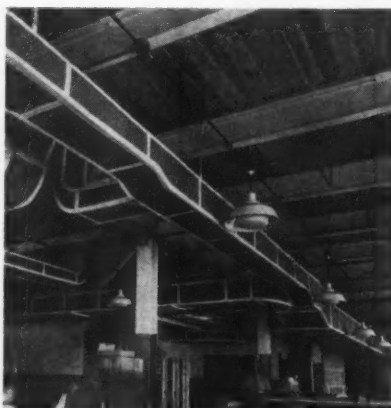
## ASBESTOS PROTECTED



1. No painting
2. Moisture Proofed
3. No waste
4. Easy to handle
5. Cuts with a knife
6. Light in weight
7. Low applied cost
8. Applies faster
9. Comes complete
10. Flexible
11. High Insulating Efficiency
12. Asbestos Protected
13. Looks better
14. High sound absorption
15. Made especially for heating and air conditioning jobs
16. Long life
17. Fits round or rectangular ducts
18. Applied inside for sound
19. Applied outside for temperature
20. Eliminates the use of lugs, bolts, screws, and wire
21. 100% contact with metal

### DUX-SULATION

comes in a complete package, ready to use. Nothing else to buy. One package contains 100 sq. ft. 36" wide of Dux-Sulation and the necessary glue and tape to complete its application. It weighs 45 pounds.



Send for  
Bulletin  
387-D Now!

**BETTER DEALERS  
BUY DUX-SULATION FROM  
BETTER JOBBERS**

## GRANT WILSON, INC.

4101 West Taylor Street

Chicago, Illinois

## PLANT RUBBER & ASBESTOS WORKS

537 Brennan Street

San Francisco, Cal.

## AIR CONDITIONING UTILITIES CO.

8 West 40th Street

New York, N. Y.

"If \$8,000 was required for annual overhead it will be necessary for the contractor selling *no* equipment to add 100 per cent Gross to his labor and iron costs to pay business expenses.

"The above figures are not exactly true comparisons between equipment, labor and selling price, but are close enough to indicate the headache that can result from installation business only and the contractor still have a mighty busy shop."

We feel that this report offers a fair cross section of prevailing practice. Whether we agree or disagree with price per opening it appears that contractors all over the country are offering just about the same thing for the same money. What seems to be needed most is a general *raising* of prices per opening rather than a general condemnation of the idea.

## Store Building Furnace Heating

(Continued from page 127)

temperatures without draft result. The pre-selected room temperature begins at a point above the usual breathing level, floor temperatures are raised, higher register temperatures and higher velocities can be used, all favorable factors in store building heating.

These diffusers are used in stores 6 to 16 inclusive; in the smaller building (stores 1 to 5 inclusive) no duct work is used outside the furnace room. The warm air supply pipe from the furnace is brought to the partition which divides the store room from the work room, widened out to form the box for a wide and narrow grille from which the air is projected at high velocity to carry to the front of the store.

### Engineering Data on Plans

The details of air volumes, air velocities, sizes of main pipes, air quantities issuing from diffusers are all indicated on the floor plans. These plans show how the system was adapted to the peculiarities of each store; in some instances special occupancy was definitely planned for and the heating system arranged accordingly. The compactness of the equipment subtracts a minimum of usable floor space, the gas firing requires no fuel bin or delivery, the heater area can be as clean as any part of the store.

With the equipment behind the partition and the pipes run between the suspended ceiling and the roof directly above, all that shows in stores 6 to 16 is the air diffusers at the ceiling and the single supply register in stores 1 to 5. The return air opening for recirculation, in all cases, is in the heater room.

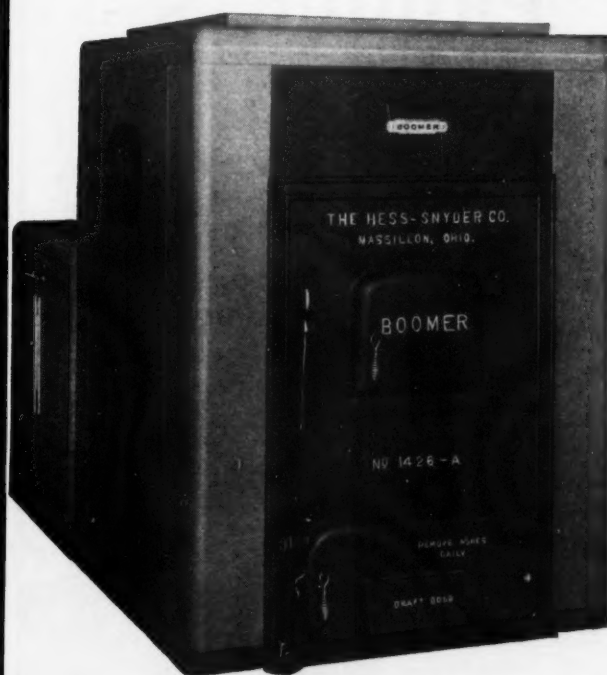
The furnaces employ Barber gas burners with full automatic controls, the burners being controlled by a thermostat. Air cleaning, as described, is by Owens-Corning filter Fiberglas assemblies set in the supply ducts.

# A MESSAGE TO FURNACE MEN

★ Dealers on the look-out for a new connection will do well to investigate the profit possibilities of the Boomer line of furnaces and air conditioning units.

Our dealer organization is a point of pride with us. We have many firms on our list who have been selling Boomer furnaces continuously for forty years. They know that our products are honestly built and priced and that they stand a much better chance to make *real profits* with the Boomer line.

Drop us a line today for further information. We'll send it to you along with names of Boomer dealers with whom you can investigate our products and policy. Do it NOW! ★

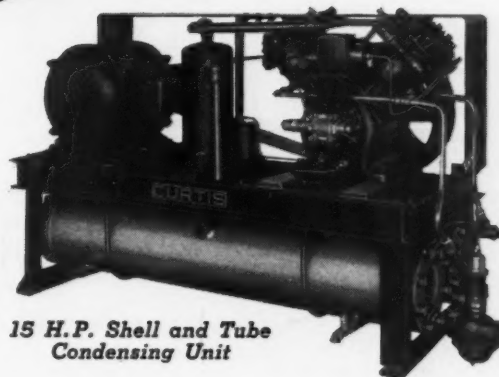


New Boomer Coal-Fired Winter Air Conditioning Unit

**THE HESS-SNYDER CO.**  
MASSILLON, OHIO

Why You Serve Your Best Interests  
and Those of Your Customers  
When You

*Specify* **CURTIS**  
Condensing Units



15 H.P. Shell and Tube  
Condensing Unit

BY RECOMMENDING CURTIS equipment you and your customers benefit by the assurance of economical, efficient, care-free performance. Check Curtis engineering details yourself, check Curtis design and construction, and you'll find reliability built into every detail.

Curtis units deliver years of trouble-free service and true operating economy under all conditions, thanks to Curtis engineering. Curtis created the exclusive patented "Centro-Ring" method of positive pressure lubrication; Curtis design includes Timken Tapered Roller Main Bearings, water-jacketed compressor heads and cylinders, drop-forged, heat-treated crankshafts and connecting rods; balanced sylphon bellows seal.

There is a Curtis model for every refrigeration and air conditioning requirement, from  $\frac{1}{6}$  to 30 h. p., air and water cooled. Counter flow, cleanable shell and tube and evaporative condenser models are available. Thousands of Curtis condensing units are in use throughout the world today.

84 years of successful manufacturing experience backs every Curtis product—including 44 years of specialization in building fine compressors. You can sell and recommend Curtis equipment in absolute confidence—for Curtis stands for *reliability* in every respect.

**CURTIS REFRIGERATING MACHINE CO.**

Division of Curtis  
Manufacturing Company  
1946 Kienlen Avenue  
Saint Louis, Missouri

Write today for  
the new Curtis  
folder C-68 on  
Air Condi-  
tioning

**CURTIS**  
REFRIGERATION  
AIR CONDITIONING  
AND COMMERCIAL



## Brenner Makes Specialty Items

(Continued from page 71)

sold. Some are made of galvanized iron, hot dipped and not painted; others are fabricated of 12-gauge black iron painted with aluminum.

### Organ Blowers

The organ blowers, previously referred to, range in size from blowers employing a 1/4-horsepower motor to blowers powered with a 5-horsepower motor. The wheels are water wheel type, the blades and rims being cut, formed and assembled by Brenner. No housing is used, instead the wheels run free within the round cabinet which is formed from 16-gauge black iron, welded, ground and finished. After the cabinet is formed, the inside is lined with acoustical material to dampen all air noise. The blower wheels are mounted on the shafts and the whole is assembled for a dynamic test before crating. Brenner furnishes the complete blower with motor to the organ manufacturer.

Very recently stoker hoppers have been put in production. These hoppers are fabricated from black iron, 16-gauge, all joints are electric arc welded, then ground and finished so that the hopper meets the demand for a piece of furniture. The hoppers, as shipped to the stoker manufacturer, are ready for painting and assembly upon the worm

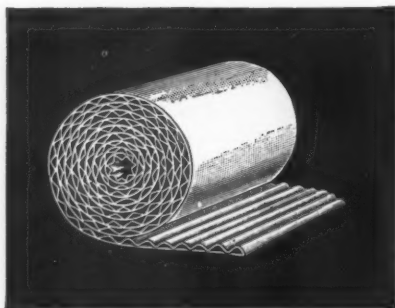
housing. Production is increasing, but has not yet become a year round production item.

### Milking Machine Pump

An item which has run into thousands of units is a vacuum tank and crank case to take a 2-cylinder pump and constitutes the operating mechanism of a milking machine. The tank is made of 12-gauge black iron, assembled by spot and arc welding, lugs and accessories are spot welded into place during assembly. To keep the punch press working, the cuts required for assembly into the finished milker are made on the punch press. A motor base is made to take the motor which operates the milker. This base is 3/16-inch plate and 10-gauge black iron and is formed in power machines.

From 500 to 1,000 of these assemblies are being made each year and production has become so steady that this item is used to fill in shop operations when other work is slack.

Although building operations have been slack, some outside sheet metal work is secured from time to time. Further, a goodly volume of industrial sheet metal work (blow pipe, material separation, fume collecting or removing systems) is solicited and secured, but today, going into the fifth year since specialty manufacturing was made part and parcel of the Brenner shop, the volume which makes profits and keeps good mechanics working the whole year through comes from the fabrication of specialty items which can be made cheaper or better by Brenner than by the manufacturer.

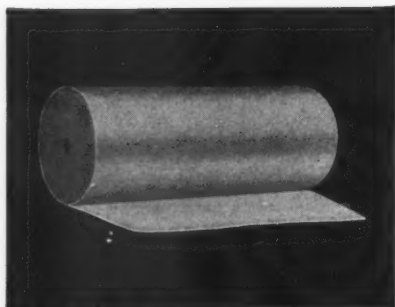


### ASBESTOS AIRCELL and MULTICELL PAPERS

In rolls containing 250 square feet.

### Aircell Sheets and Blocks

In Standard and Special Sizes.

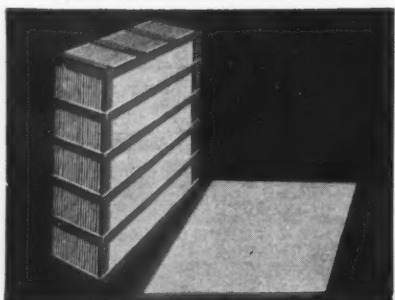


### ASBESTOS PAPER and ROLLBOARD

In Standard weights and widths.

### Pipe-Joint Tape

In 2-inch and 3-inch widths.



### ASBESTOS MILLBOARD

In Standard sizes and thicknesses and in Special Sizes cut to order.

## SAL-MO ASBESTOS PRODUCTS

for Warm Air Insulation  
and Air Conditioning

The Sall Mountain Company manufactures a complete line of SAL-MO Asbestos Insulation Materials for Furnace building and installation, Stove and Oven Linings, all kinds of Warm Air Heating and Air Conditioning Equipment.

Other Standard and well known SAL-MO Products include Asbestos Cements and Coverings for all kinds of High Pressure and Low Pressure Pipe Lines.

WRITE US REGARDING YOUR INSULATION REQUIREMENTS

**SALL MOUNTAIN COMPANY**  
176 West Adams Street Chicago, Illinois

### ASBESTOS FURNACE CEMENT

Made from the best grades of asbestos fibre and the finest high temperature refractory clays. Easy to apply; binds and hardens quickly; forms a perfect joint with all metals, fire-brick and stone. Will not crack or shrink.



## *Dailaire* The Master Air Conditioning System of America

The result of eight years research and development work. Embodies every phase of air conditioning in one casing, including the following exclusive features.

- 1—Top Blower (Pulls the air through unit).
- 2—Multiple Blowers (Especially adapted to zone controlling).
- 3—Pre-heating of Air (Counterflow principle).
- 4—Washed air for perfect humidity.
- 5—Double filter system (Wet and dry).
- 6—Positive cooling (Refrigeration or water).

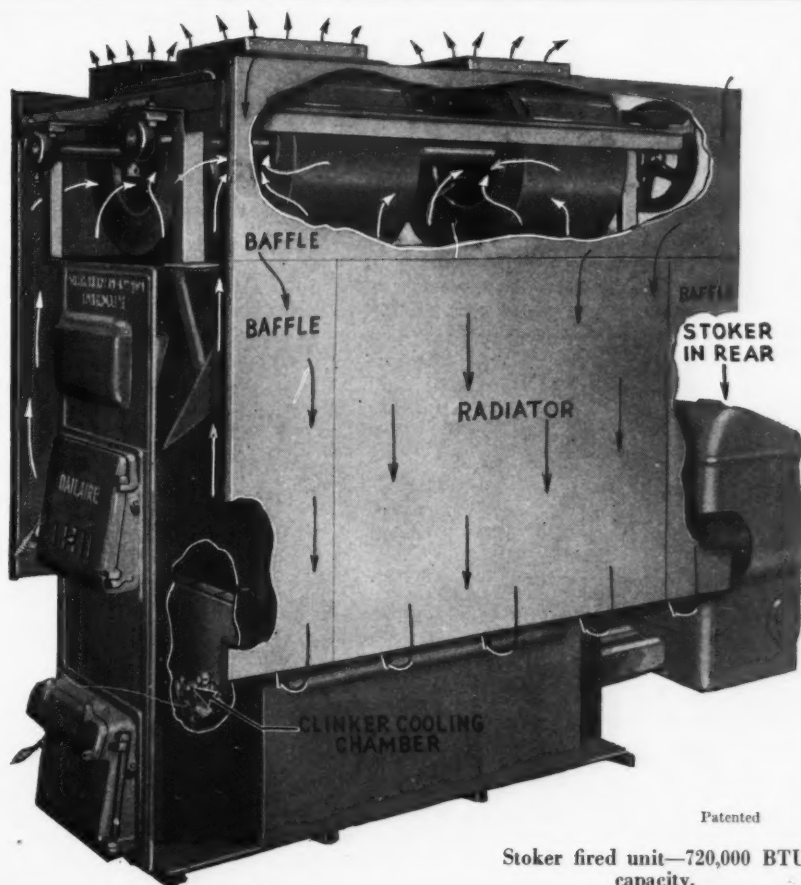
Engineering service available of the highest caliber.

Units adaptable to oil—Gas or coal.

55,000 BTU to 750,000 BTU capacities.

Get our exclusive dealer proposition.

**DAIL STEEL PRODUCTS CO.**  
1050 MAIN ST. LANSING, MICH.



## MORE PROFIT — *plus proved sensitivity and reliability!*

Gleason-Avery Temperature Controls provide dealers and jobbers with the ideal combination of precision-made, quality controls plus a wider margin of profit on each installation. They have been proved by years of use in thousands of installations. Contractors and heating engineers recommend them for their sensitivity and trouble-free performance. Any combination of the controls below, with accessories, available in package units. See the complete G-A line at your jobber's. Or write for full details.

### APPROVED

G-A Temperature Controls are fully approved by the Anthracite Industries Laboratories and by the Underwriter's Laboratories.



## G-A TEMPERATURE CONTROLS



**STACK SWITCH**

For any two or three wire circuit using high or low voltage. A snap action single pole switch with double throw and double break has pure silver contacts. Assures perfect contact.



**CONTROL MOTOR**

For draft and check damper controls; also, mixing dampers, gas valves and similar equipment. Dust-tight. Rust proof. Powerful. Sturdy.



**THERMOSTAT**

New, improved single Thermostat. Low voltage. Highly sensitive and dependable. Base design affords free air circulation and improves sensitivity. Tested and calibrated at factory. Easy screw control for field adjustment.

### New Low Prices!

WRITE today for complete catalog and **NEW LOW PRICES**, or see your Jobber.



**FAN SWITCH**

For circulating fan in Forced Warm Air Systems. Same as Immersion Water Switch. Easy to install and to adjust to desired temperature range.

**GLEASON-AVERY, Inc. 24 CLARK STREET AUBURN, N. Y.**



# G. H. Q.



## Grille Head-Quarters

### OUR THREE NEW LINES

were developed in 1938 to meet modern requirements

Any Type Register Face Can Be Used With Any of the Shutters Shown Below.

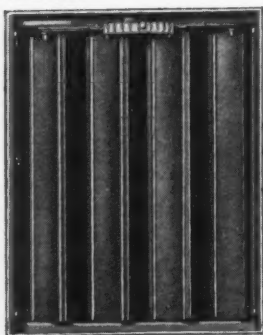
*New Non-Rusting Feature of Brass Bearings Used on All of These Shutters*

#### THE FIRST STEP

In real Register improvement is the new "Air-Con" Register. Cut at right shows the multiple

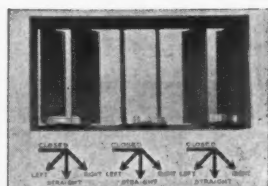


shutters of the Register Bottom. Shutters have a throw of 135°, can be made to throw either right and left (or up and down).



#### THE SECOND STEP

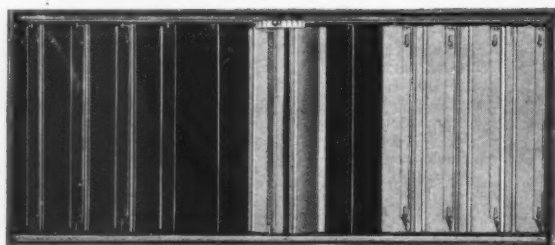
The second step showing the "Battery" Register. Cut below shows method of control and deflection. This Register is a development of the "Air-Con" and is midway in price between the "Air-Con" and the "Arc-Eng" shown below.



#### THE LAST STEP and the WINNER

The one Register that can be adjusted at the Face, giving complete control, and when used with the adjustable Face gives nine-way deflection.

**\* AR C ENG**  
ARCHITECT ENGINEER  
TRADE MARK



**WATCH! A New Development is Coming**

REGISTER & GRILLE MFG. CO., INC., 70 Berry St., Brooklyn, N. Y.

JAMES H. BAILEY, President  
TROWBRIDGE WARNER,  
Sales Manager  
RUSSELL T. BAILEY, Director  
BRUCE R. TUTTLE, Gen'l Counsel

CLIFFORD D. BAILEY, Secretary  
EDWARD F. BLOM, Director  
FRANK T. BAILEY, Vice President  
ALFRED L. TUTTLE, Treasurer  
ERIC D. MOLLANDER, Director

## Controls for Cooling Systems

(Continued from page 110)

thermostats are usually furnished with a transfer switch to change from one cycle to the other, (Fig. 12). The two thermostats may, if desired, be furnished as a single instrument with both thermostats under a common cover.

However, when the blower is controlled from the room thermostat during the heating cycle, only a single thermostat is required, and the relay it controls is common to both the heating and the cooling cycles. Usually a transfer switch is provided in the relay itself for the change-over operation, (Fig. 13).

### Standard Control Systems

It is obvious that a combination of control units can be devised to meet the cooling control requirements of any installation. Experience has shown, however, that the number of combinations or systems generally used are comparatively few.

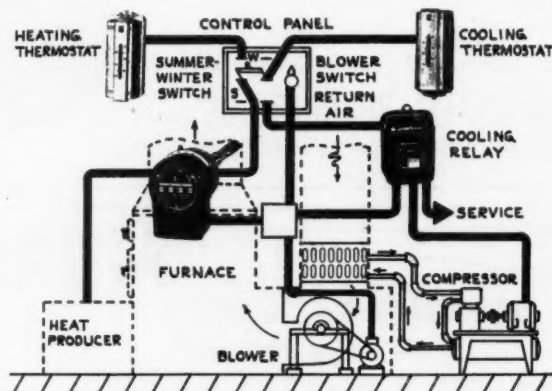


Fig. 15

One standard system, (Fig. 14), is for use with an air conditioning system, in which the blower is controlled by bonnet temperatures during the heating cycle. When the summer-winter switch is in the winter position the heating thermostat is in command of the heating equipment and the summer thermostat and associated apparatus inoperative. With the switch in the summer position, the cooling thermostat is in command of the motorized water valve in the line to the cooling coil, and the heating equipment inoperative. Blower operation during the cooling cycle is controlled by a manual switch and the circuit so arranged that the valve to the coil cannot open unless the blower is operating.

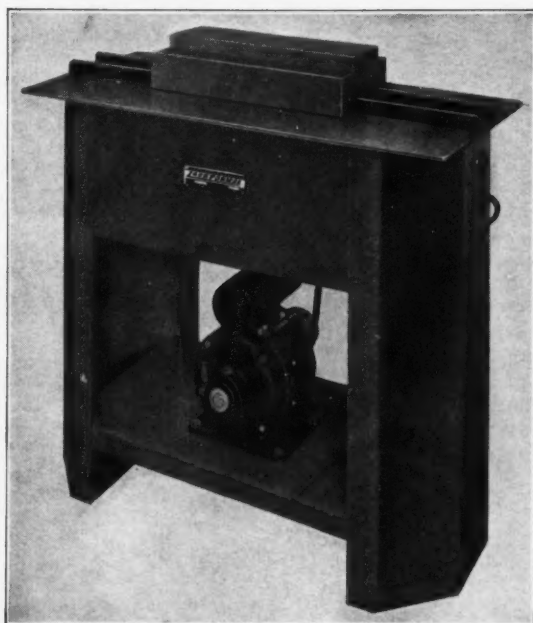
A similar air conditioning system using mechanical refrigeration instead of cold water requires an additional relay, (Fig. 15), to control the compressor and operate the blower intermittently during the cooling cycle. A switch may be provided to give continuous blower operation if desired. A solenoid valve in the liquid line to the coil may be operated by the relay instead of the compressor, in which case, the compressor will operate entirely from suction pressures.



# NOW!

A PITTSBURGH LOCK  
and

DOUBLE SEAM MACHINE  
that every shop can afford



An extremely rugged machine with  
precision workmanship at a

**remarkably low price**

through quantity production.

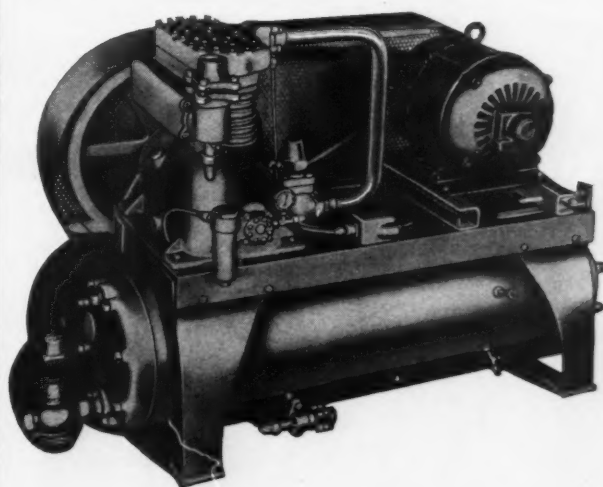
Capacity 22 gauge and lighter—ample reserve  
capacity—approximately 35 ft. per minute. Posi-  
tively foolproof—simple operation.

Start the New Year right. Reduce your  
shop costs substantially with a Lockformer.

*For complete details, see your jobber or write*

**THE LOCKFORMER COMPANY**  
4409 W. Kinzie Street Chicago, Ill.

**LOCKFORMER 22**



*... by Appointment to*  
**Leading MANUFACTURERS**

For 17 years, Universal Cooler has  
been building electric refrigerating  
machines.

We are pioneers in the policy of selling  
commercial refrigerating and air con-  
ditioning units exclusively to other  
manufacturers.

Quietly, and without "ballyhoo" we  
have secured and maintained a posi-  
tion as the leading supplier of con-  
densing units "by appointment" to  
some of the largest and best known  
manufacturers in the industry... con-  
clusive evidence that *architects* and  
*consulting engineers* may specify con-  
densing units manufactured by Univer-  
sal Cooler with complete confidence in  
their performance and dependability.

Universal Cooler products are avail-  
able to *heating and ventilating con-  
tractors* through many experienced  
and reliable manufacturers of refriger-  
ating and air conditioning equipment.

We will be glad to send complete in-  
formation on request.

**UNIVERSAL COOLER**  
DETROIT, MICHIGAN

*In Canada: Universal Cooler Co. of Canada Ltd.  
Brantford, Ontario*



## Remarkable features of new Asbestos Paper endorsed by users

EVERYWHERE it's the same story. "You should have brought out No. 43-A Asbestos Paper *long ago*. It fills a long-felt need. Never before have we been able to get in one product the remarkable strength found in No. 43-A and at the same time know that it contains no inflammable adulterants usually used as strengthening agents in commercial asbestos papers.

"You have a remarkably fine blue-white color. The smooth surface does not retain dirt readily and wherever dirt does collect, it can be wiped off; this paper actually repels moisture."

What these contractors have found, you, too, will discover if you will but test No. 43-A. For this unique product has everything—*strength, color and finish*—to make it the ideal Asbestos Paper.

See these qualities for yourself. Send for the 5-foot free sample of No. 43-A. We will gladly mail you this sample for test, if you will mail the coupon below.



The RUBER-OLD Co., Insulation Department  
500 Fifth Avenue, New York City

Send us your free 5-foot test sample of No. 43-A Asbestos Paper. We understand this places us under no obligation.

AA 1

Name.....

Address.....

City..... State.....

Since Ruberoid sells through wholesale trade only, please give jobber's name.

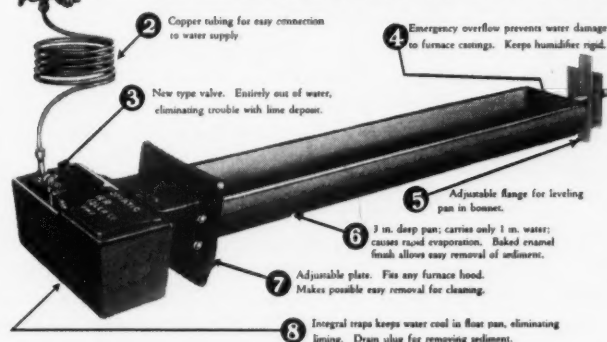
## Voorhees Tables

(Continued from page 98)

**TABLE 29**  
**For Register 75 Feet from Furnace**

| HEAT LOSS<br>Thousands<br>of Btu<br>per<br>hour | REGIS-<br>TERS<br>& Return<br>Air Faces,<br>free area.<br>Also stud-<br>ding spaces<br>used for<br>Returns | RISERS<br>Supply or<br>Return.<br>Also<br>panned<br>joist<br>spaces<br>used for<br>Returns | BRANCH<br>from<br>Supply<br>or<br>Return<br>Trunk | TRUNK<br>Line<br>Duct,<br>Supply<br>or<br>Return | CFM<br>at<br>Reg.<br>Temp.<br>135<br>Deg. |
|---|--|--|---|--|---|
|   | 350 FPM  | 400 FPM  | 500 FPM   | 600 FPM  |   |
| 4   | 25   | 21   | 17  | 14   | 59  |
| 4.5   | 28   | 24   | 19  | 16   | 67  |
| 5   | 31   | 27   | 21  | 18   | 74  |
| 5.5   | 34   | 29   | 24  | 20   | 82  |
| 6   | 37   | 32   | 26  | 21   | 89  |
| 6.5   | 40   | 35   | 28  | 23   | 97  |
| 7   | 43   | 37   | 30  | 25   | 104                                       |
| 7.5   | 46   | 40   | 32  | 27   | 111                                       |
| 8   | 49   | 43   | 34  | 29   | 119                                       |
| 8.5   | 52   | 46   | 36  | 30   | 126                                       |
| 9   | 55   | 48   | 39  | 32   | 134                                       |
| 9.5   | 59   | 51   | 41  | 34   | 141                                       |
| 10  | 62   | 53   | 43  | 36   | 149                                       |
| 11  | 68   | 59   | 47  | 39   | 163                                       |
| 12  | 74   | 64   | 51  | 43   | 178                                       |
| 13  | 80   | 70   | 56  | 46   | 193                                       |
| 14  | 86   | 75   | 60  | 50   | 208                                       |
| 15  | 92   | 80   | 64  | 53   | 223                                       |
| 16  | 99   | 86   | 68  | 57   | 238                                       |
| 17  | 105  | 91   | 73  | 61   | 253                                       |
| 18  | 111  | 96   | 77  | 64   | 267                                       |
| 19  | 117  | 102  | 81  | 68   | 282                                       |
| 20  | 123  | 107  | 86  | 71   | 297                                       |
| 21  | 129  | 112  | 90  | 75   | 312                                       |
| 22  | 136  | 118  | 94  | 78   | 327                                       |
| 23  | 142  | 123  | 98  | 82   | 342                                       |
| 24  | 148  | 128  | 103   | 86   | 357                                       |
| 25  | 154  | 134  | 107   | 89   | 371                                       |
| 26  | 160  | 139  | 111   | 93   | 386                                       |
| 27  | 166  | 144  | 116   | 96   | 401                                       |
| 28  | 173  | 150  | 120   | 100  | 416                                       |
| 29  | 179  | 155  | 124   | 103  | 431                                       |
| 30  | 185  | 160  | 128   | 107  | 446                                       |
| 31  | 191  | 166  | 133   | 111  | 461                                       |
| 32  | 197  | 171  | 137   | 114  | 475                                       |
| 33  | 203  | 177  | 141   | 118  | 490                                       |
| 34  | 210  | 182  | 145   | 121  | 505                                       |
| 35  | 216  | 187  | 150   | 125  | 520                                       |
| 36  | 222  | 193  | 154   | 128  | 535                                       |
| 37  | 228  | 198  | 158   | 132  | 550                                       |
| 38  | 234  | 203  | 163   | 136  | 565                                       |
| 39  | 240  | 209  | 167   | 139  | 579                                       |
| 40  | 247  | 214  | 171   | 143  | 594                                       |
| 41  | 253  | 219  | 175   | 146  | 609                                       |
| 42  | 259  | 225  | 180   | 150  | 624                                       |
| 43  | 265  | 230  | 184   | 153  | 639                                       |
| 44  | 271  | 235  | 188   | 157  | 654                                       |
| 45  | 277  | 240  | 193   | 160  | 669                                       |
| 46  | 284  | 246  | 197   | 164  | 684                                       |
| 47  | 290  | 251  | 201   | 168  | 698                                       |
| 48  | 296  | 257  | 205   | 171  | 713                                       |
| 49  | 302  | 262  | 210   | 175  | 728                                       |
| 50  | 308  | 267  | 214   | 178  | 743                                       |
| 55  | 339  | 294  | 235   | 196  | 817                                       |
| 60  | 370  | 321  | 257   | 214  | 892                                       |
| 65  | 401  | 348  | 278   | 232  | 966                                       |
| 70  | 432  | 374  | 300   | 250  | 1040                                      |
| 75  | 462  | 401  | 321   | 267  | 1114                                      |
| 80  | 493  | 428  | 342   | 285  | 1189                                      |
| 85  | 524  | 455  | 364   | 303  | 1263                                      |
| 90  | 555  | 481  | 385   | 321  | 1337                                      |
| 95  | 586  | 508  | 407   | 339  | 1411                                      |
| 100   | 617  | 535  | 428   | 357  | 1486                                      |

## 1 How the **CHAMBERLIN** *Automatic* HUMIDIFIER



Freedom from liming, out-of-water valve, patented trap cast integral and durable one-piece cast iron construction are outstanding Chamberlin features that assure years of dependable, highly satisfactory service.



### Free Dealer Helps

To aid you in selling Chamberlin Automatic Humidifiers, this attractive 3-color display stand and a supply of circulars are shipped to you Free with your order. Order now and get these sales helps to work for you in your window or on your display floor.

## Helps you Earn *Extra Profits* during the Heating Season

**T**HE improved Chamberlin Automatic Humidifier is a real money-maker for you because it can be quickly and easily installed in ANY furnace at any time. Every warm air heating plant in your vicinity that does not now have automatic humidifying equipment represents a potential customer.

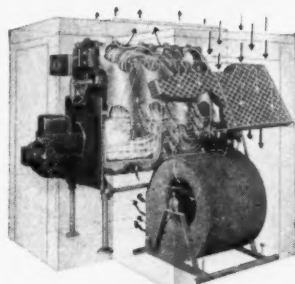
Here's your chance to cash-in on EXTRA PROFITS during the season when demand for complete new jobs is at low ebb. You gain many new and well pleased customers because the Chamberlin assures added heating comfort, greater health protection and new heating economy.

A leader for over 13 years, the Chamberlin is sold by thousands of alert dealers from coast to coast. Let this trouble-free, fully automatic humidifier make money for you. Write today for free circulars and full details.

## MANUFACTURED BY **CHANDLER COMPANY CEDAR RAPIDS, IOWA**

## EXCELSIOR WARM AIR HEATING EQUIPMENT

### EXCELSIOR WARM AIR FURNACES



Unique Oil Burning Air Conditioner. Cast iron Heating Element provides greater radiating surfaces with increased heating efficiency.

Made in three sizes:

B1—121,000 Btu.

670 to 1300 CFM.

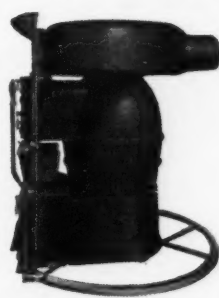
B2—141,000 Btu.

1160 to 2100 CFM.

B3—161,000 Btu.

1160 to 2100 CFM.

Unequalled for economy, heating efficiency and quietness.

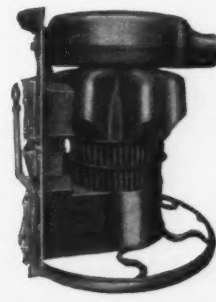


#### ERA

Cast iron. Made in six sizes, rated 336 to 869 sq. in. warm air pipe capacity.

#### SUPERLIFE

Chrome-alloy cast iron of similar design with 20 year guarantee.

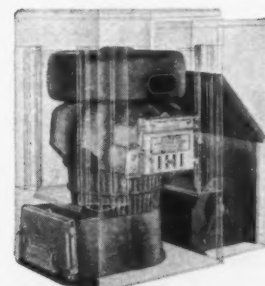


#### FAMOUS

Cast iron. Made in three sizes, rated 595 to 843 sq. in. warm air pipe capacity.

#### STEEL FURNACES

Two models ranging from 401 to 1217 sq. in. warm air pipe capacity.



#### FAMOUS EXL-AIR

Square cased Units with blower, blower switch and automatic humidifier.

Made in three sizes, rated from 111,600 to 158,700 Btu. and 670 to 2100 CFM. Standard model permits side stoker installation.

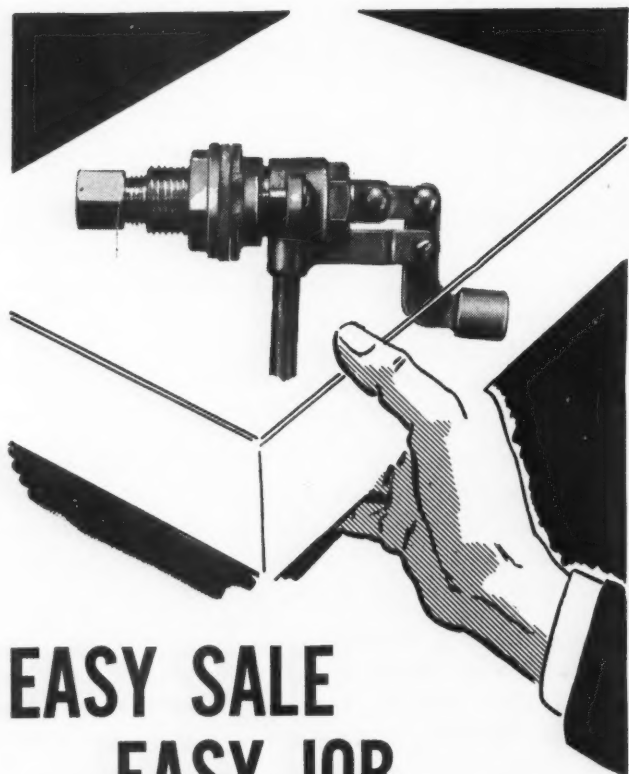
### EXCELSIOR FORCED AIR DUCTS AND FITTINGS

Standardized, prefabricated ducts and fittings for forced air and air conditioning installations.

Full information on our complete line of Warm Air Heating Equipment upon request.

**THE EXCELSIOR STEEL FURNACE CO.**  
118 S. CLINTON ST. CHICAGO, ILL.





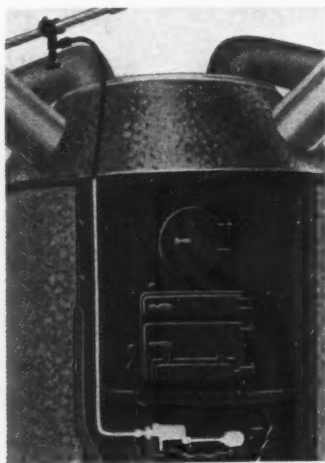
## EASY SALE ... EASY JOB with help from M-VB

Think of this sales mover: in one small box is a complete system to protect your customer's health — and pocketbook.

M-VB humidification provides healthful moisture by keeping the water pan full to the right level on any warm-air furnace. Proper humidification requires less heat... saves on fuel.

*All the necessary parts are in the box. Install them in thirty minutes, and without dropping the fire!* Complete stocks maintained at Sturgis, Michigan; Waterville, Connecticut; and San Francisco, California.

Write for your supply of free descriptive booklets that will help you sell this finely-built M-VB money-maker!



# M-VB

MORENCY-VAN BUREN DIVISION  
SCOVILL MANUFACTURING CO.

*A Complete Line of Closet Tank Fittings*

## National Warm Air Convention

*(Continued from page 134)*

operation in which the whole house was cooled at the same time. A series of tests not completed showing the heat flow through walls in the research residence indicated that insulation in walls does not store up heat as some contractors have believed.

### Ducts for Heating and Cooling

Research Assistant Engdahl, speaking on air volumes required for heating and cooling, meaning thereby the type of system which employs the same ducts and the same fan for heating and for cooling, described the test as an attempt to find out whether or not the same piping system and fan could be used. Mr. Engdahl pointed out that the tests show that the same amount of air can be used for cooling as for heating, but the idea does not appear practical as very low summer register air temperatures must be used for cooling. The only way in which this might be adopted is to use very heavy wall and ceiling insulation, plus awnings in summer and a very low register air temperature and large air volumes for winter heating so that the two volumes will more nearly approach one another.

### Maintenance of Private Enterprise

One of the outstanding addresses of the convention was that of Charles B. Hook, President of American Rolling Mill Company and President of the National Manufacturer's Association, who, speaking on "The Maintenance of the Private Enterprise System," declared that this industry of ours has in the last ten years obsoleted all American homes, credit for which should be paid to Professor A. C. Willard and the patient work which has been carried on under him in the research program. Declaring that the maintenance of private enterprise was very close to his heart, Mr. Hook said that this country, operating under the private enterprise system, shows the highest buying power per individual citizen of any nation in the world; that 22 million families have savings bank accounts; that 65 million people own life insurance policies; that an increasingly large percentage of young Americans usually finishes high school and college; that new luxuries (like automobiles, radios and better food products) are more abundant here than anywhere on the globe; that this nation can point to this accomplishment as work well done.

The primary problem of business today, declared Mr. Hook, is to make living better for the low income class without depriving those of better income of any of the things to which they have become accustomed. Industrial initiative is the keystone, and theorists are too apt to stifle initiative. He pleaded for such governmental and business organization that private enterprise can continue to operate; that turn-over of capital and enterprise and business initiative may be unhindered; and that only enough taxes be taken away from business to run the government efficiently. He asked that the

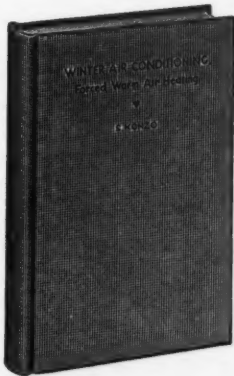
## Now Ready!

*The book all heating men  
have been waiting for . . .*

### WINTER AIR CONDITIONING FORCED WARM AIR HEATING

BY S. KONZO

Research Assistant Professor  
University of Illinois



Now, at last, there is available for heating men, in regular book form, a complete record of the results of the exhaustive studies of forced warm air heating carried out over a period of several years at the University of Illinois Research Residence. This newly published volume, WINTER AIR CONDITIONING embodies ALL of the vast fund of practical knowledge which has come out of the investigations. It is filled

with basic information that heating men everywhere will find invaluable as a guide to correct and up-to-date practice in the design and installation of forced air heating and residential air conditioning systems.

The author, S. Konzo, actually lived in the Research Residence during the entire period of the studies, and himself conducted or had a hand in every one of the innumerable tests that were made on the Residence forced air system. Konzo was chosen to organize and analyze the test findings for the industry in permanent book form not only because of his first hand knowledge of the test results, but also because of his ability to write clearly and concisely. In WINTER AIR CONDITIONING he has turned out a volume that will, without question, quickly become, and for years remain, the "bible" of the forced warm air heating industry.

WINTER AIR CONDITIONING belongs in the hands of every one interested in forced air heating or residential air conditioning. As this book has been published by the National Warm Air Heating and Air Conditioning Association primarily to make its invaluable data readily available to all, it is offered to the industry at the low, non-profit price of only \$3.00 per copy. To obtain a copy promptly send your order and remittance today to the address below.

Those who are interested also in the Association's previous book, "Gravity Warm Air Heating, Digest of Research," which is also priced at \$3.00, may obtain this book and WINTER AIR CONDITIONING together at the reduced combination rate of only \$5.00.

**KEENEY PUBLISHING COMPANY**

6 N. Michigan Ave., Chicago, Ill.

## You'll like our NEW ADDITION



For HEATING, AIR CON-  
DITIONING, FURNACES,  
HOT WATER, REFRIG-  
ERATION, OVENS, FANS

### And Here's Why

The basic principle—"Hydraulic Action" of an expanding liquid—is essentially sound . . .

Due to positive "Hydraulic Action" these controls are permanently accurate . . . with exceptionally close differential . . . and cost no more than ordinary controls.

Due to "Friez Hydraulic Action", switch construction is sturdy, compact, and easy to install and maintain.

Due to "Friez Hydraulic Action", contact pressures are high—and so are current ratings.

Due to "Friez Hydraulic Action"—sustained, sure repetition of performance is assured.

Just jot your name below and mail the coupon today for details of these new and amazingly simple controls.

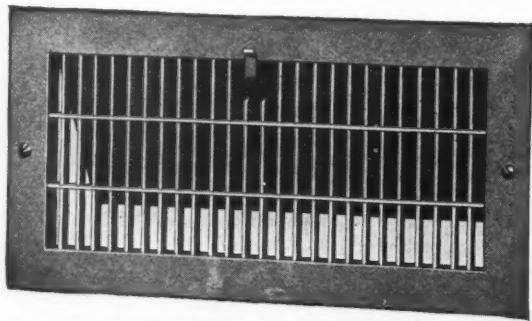


Send me details on the New  
Hydraulic Controls

Firm \_\_\_\_\_ Address \_\_\_\_\_  
Attn. \_\_\_\_\_ Position \_\_\_\_\_ 2

**JULIEN P. FRIEZ & SONS, — BALTIMORE, MD.**  
Division of Bendix Aviation Corporation

## REGISTERS and GRILLES



No. 3310 REGISTER WITH INDIVIDUAL ADJUSTMENT OF GRILLE BARS—45° UPWARD OR DOWNWARD.

Standard Stamping presents to the heating and air conditioning trade a striking new line of registers and grilles for gravity warm-air heating, air conditioning and ventilating systems. Modern in appearance and far better than average in performance, they offer the contractor an unusual opportunity to add the final touch to a good job, and at the same time, save money.

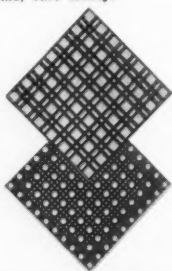
A complete catalog containing time saving charts and tables as well as the full line of "Standard Air-Control" registers and grilles is now available and will be sent on request. Write for your copy today!

### PERFORATED METALS

Screens and grilles for many industrial purposes such as sorting, sifting, and light fancy panels. We have a complete line for almost any use.

### WRITE for CATALOG!

**STANDARD STAMPING & PERFORATING COMPANY**  
3131 W. 49th Place Chicago, Illinois



## AJAX

FOR 1939

A new line of PREFABRICATED DUCTS and FITTINGS for forced air and air conditioning installations.

### A NEW IMPROVED LINE of GRAVITY FURNACE FITTINGS

Our catalog "A" Gravity Fittings, Catalog "B" Forced Air Fittings is yours on request.

### THE CINCINNATI SHEET METAL & ROOFING CO.

Furnace Fitting Department

230 E. Front St.

Cincinnati, Ohio

government should be eliminated, wherever possible, from competition in business; that reduced government expenses should be the thing everyone strives for, bearing in mind that unemployment relief should not be curtailed where it is warranted, and he asked that every man in business should cooperate with the movement now under way to give the public all the facts about the free enterprise system.

### Continuous Fan Operation

G. W. Denges discussed continuous blower operation not as a new idea, but an old idea in processing and large ventilation jobs. In furnace heating the advantages of continuous blower operation are better fuel economy, better filtering and cleaning of the air, better and more controllable humidification, more uniform room temperature and quieter fan operation. Better control over room temperatures is obtained because there are few periods during which firing is carried on at a high rate, which also induces a better fuel economy and the constant circulation of warm air through the rooms tends to maintain a more uniform temperature between floor and ceiling, thus eliminating those cold floors which are unsatisfactory to the home owner. Better humidification can be obtained since the blower is operating all the time and humidity can be added to the air when needed, rather than only when the blower is operating.

The greatest problem of constant blower operation is the danger of too low a register temperature, and the second problem is the higher power cost required to operate the fan constantly. This higher power cost should not exceed ten to fifteen per cent, and the too low register air temperature can be controlled by satisfactory instruments. The least expensive job, in the estimation of Mr. Denges, is that installation employing a two-speed fan. The fan runs on low speed (between 125 and 160 degrees) and on high speed at all temperatures above 160 degrees in the bonnet. If the room is satisfied at bonnet temperatures between 125 and 160 degrees the fan never runs on high speed; but if the room remains unsatisfied the fire continues to increase and the burner goes into high speed at 160 degrees. A variation of two speed operation is that method which employs a damper in the intake of the blower and a damper motor which increases or decreases the air volume to the blower.

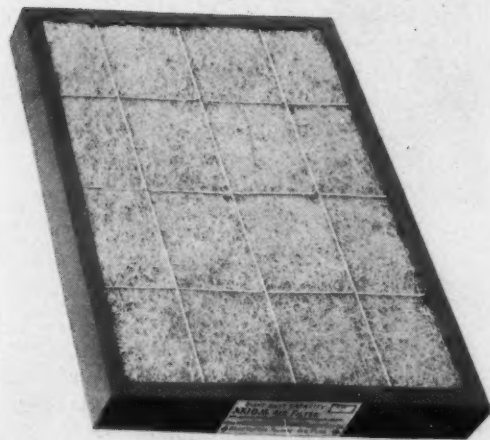
### Coke as a Fuel

"The Use of Coke With Warm Air Equipment" was discussed by H. R. Rost. He explained how coke is made and just what are the advantages of this type of fuel. He pointed out that there are two or three different kinds of coke and that the home owner should be sure to buy the type of coke most suitable to domestic use. Coke is a popular fuel, declared the speaker, because it offers the largest amount of usable heat, is smoke, soot and dirt free, and at the present time is available practically every place and at a comparable fuel price. The speaker declared that he would be interested in knowing



# AXIOM

## FLAME PROOF REPLACEMENT TYPE FILTERS



Highly Efficient — Low in Cost — Flameproof — Odorless. Intake side made of special Cactus Fibre insures large dust holding capacity and even build-up. Center section treated with odorless non-run oil, flameproofed. Outlet side made of Hair evenly distributed to trap and hold even the finest particles of dust. Made in all standard sizes. Write for further details and quotations.

**BLOCKSOM & COMPANY**  
MICHIGAN CITY INDIANA, U. S. A.

### *Elgo* Ventilating Specialties

## A Shutter With Unusual Features . . . . !

**Tightest Fitting  
Shutter  
on the  
Market**

(1) Louvres weatherstripped on inner edge, instead of on outer edge, making shutters open more easily and fit more snugly. Tightest fitting shutter on the market.

(2) Swivel-joint with hardened steel bushing. No wear or rattle. Good for the life of the shutter.

More sensitive than any other automatic shutter, and longer lasting. Built to any size, square or rectangular.



ELCON TYPE

### STATIONARY SHUTTER

An all-steel shutter with stationary blades at an angle of 45 degrees, which prevents birds, leaves and other matter from entering. Used both for intake and exhaust ventilation in industrial, commercial and residential buildings. Sizes from 10" to 60" square—also rectangular.

### MAIL COUPON

Elgo Shutter & Mfg. Co.  
634 W. Warren, Detroit, Mich.

**Free  
CATALOG**

Please send catalog showing the items checked below:

Automatic Shutters  
Stationary Shutters  
Hand Operated Shutters

Ceiling Dampers  
Balanced Vent Units

Name .....

Address .....

City ..... State .....

**Elgo Shutter & Manufacturing Co.**

634 W. Warren

Detroit, Mich.

## STAR BRAND COPPER RIVETS AND BURS



**BLAKE & JOHNSON CO. Est. 1849**

Other Products:  
STOVE BOLTS SCREW MACHINE PRODUCTS  
MACHINE SCREWS MACHINE SCREW NUTS  
SPECIAL HEADED and THREADED PARTS  
MADE FROM WIRE and ROD

**WATERVILLE  
CONNECTICUT**

## QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

**DEALERS—write for free  
Hess Sales Plan to increase  
winter business.**

By selling—repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

•  
HESS BLOWER FILTER UNITS  
HESS WELDED STEEL FURNACES  
HESS AUTOMATIC OIL BURNERS  
HESS AUTOMATIC COAL STOKERS

•  
ARE GREATEST VALUES  
AT LOWEST PRICES  
•

•  
The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

**WRITE FOR DEALER PORTFOLIO**  
**HESS WARMING & VENTILATING CO.**  
1211-27 S. WESTERN AVE. Founded 1873  
CHICAGO, ILLINOIS

why a magazine type of furnace, designed for coke burning might not be popular. Coke should work well in a magazine furnace since the coke does not cake or ignite in the magazine and a furnace so designed would offer the home owner a degree of automatic firing without any mechanical equipment.

The Association reelected present officers for 1939, as follows: President, L. R. Taylor; First Vice President, C. A. Olsen; Second Vice President, F. G. Sedgwick; Managing Director, Allan W. Williams; Directors—Ralph Blanchard, Perl Miller, C. Ackerson and Buhl Allen.

### Entertainment

By no means of lesser interest than the programs was the entertainment provided jointly by the American Rolling Company and the Williamson Heater Company, at which a very elaborate and lengthy floor show was offered, together with a very excellent dinner. Session attendance was stimulated by the drawing of door prizes given by manufacturers and jobbers.

Managing Director Allan Williams was honored for twenty-five years of service as secretary and managing director of the Association with an award of three hundred silver dollars and a silver pencil presented by the Association.

### Illinois Sheet Metal Contractors Association Convention Program

**Wednesday, January 18 (Morning)**

Call to order and Address of Welcome

"Warm Air Heating Codes and Ordinances."—J. D. Wilder.

General Discussion and Questions on Proposed State Code.

—J. E. Peterson

#### (Afternoon)

"Past, Present, and Future of Forced Air Heating"—R. P. Whitmer

"Gas Heating Co-operative Plan Between the Public Service Company and The Sheet Metal Contractor"—J. G. Farnsworth

"What's Going On In The Stoker Industry"—K. C. Richmond

"Past, Present, and Future in the Oil Burner Field"—L. I. Aldrich

Question Box and General Discussion—George Harms

#### (Evening)

Informal general get together and get acquainted meeting between salesman's auxiliary and contractors.

#### Thursday, January 19 (Morning)

"Looking Ahead in the Sheet Metal Contracting Business"—Bennett Chapple

"Electric Welding in the Sheet Metal Shop"

"Legislation Affecting the Sheet Metal and Warm Air Heating Industry"—E. C. Carter

"Question Box and General Discussion"—W. W. Johns

#### (Afternoon)

"Development of Electric Controls in Connection with Modern Warm Air Heating"—Charles L. Saunders

"What Is Necessary to Secure the Passage of Laws to Govern the Installation of Warm Air Heating Equipment"—Reed F. Cutler, State Representative of the 43rd District of Illinois

"What Can Be Accomplished By a Good Association"—D. C. Ellison

"What the International Sheet Metal Workers Association is Doing to Secure the Allotment of Sheet Metal Work to Sheet Metal Men"—William H. Wickman, International Representative

#### (Evening)

Banquet and entertainment for members of the association and ladies by the Salesmans Auxiliary

**"BB"**  
The Mark  
of  
Quality

Seam  
Locked  
Every  
Few  
Inches

**"Shur-  
Lock"  
Pipe.**

**BERGER BROTHERS CO.**  
229-237 Arch Street, Philadelphia, Pa.

EAVES TROUGH  
GUTTER HANGERS  
CONDUCTOR FASTENERS  
MITRES  
END PIECES AND CAPS  
CONDUCTOR HEADS  
ORNAMENTAL STRAPS  
VENTILATORS, ETC.

Write for catalog of the "BB" Line  
Buy from your jobber

## A FULL STOCK

Every kind of repair part to fit that you may need is ready, awaiting your order at Central. Central parts make repair jobs easier, and easier repairs mean more profits. Write for full information and catalogue today.

**REPAIR PARTS**

**CENTRAL**

**FURNACE & STOVE REPAIR CO.**  
3937 Olive St. St. Louis, Mo.

## NOTICE

### CALESCO CORPORATION

FORMERLY  
**PERFECT BURNER CO.**

Because of diversified products unrelated to the Oil Burner Industry a change in name is essential.

*Products Manufactured*

**AIR CONDITIONING — STEEL FURNACES  
OIL BURNERS — ACCESSORIES  
BEER COOLING EQUIPMENT  
SPECIAL APPARATUS FOR  
CHEMICAL PROD. MANUFACTURERS**

**CALESCO CORPORATION**  
LYNN — MASS.

**FURNACE MEN!**  
HERE'S A  
SURE CURE FOR THAT  
**COLD ROOM  
PROBLEM!**

**VICTOR  
HEAT BOOSTERS**

**Floor Type \$7.50**

**Wall Type \$10.00**

NOW'S the time to make those "Cold Rooms" pay you a handsome extra profit. Victor Heat Boosters are just what you need to do the job and do it quickly. It takes only 3 minutes to install a Victor Booster in either floor or wall type registers. Then, the powerful fan pulls out the cold air "cork" and the heat comes up in a hurry to make the room warm and cozy. A demonstration will sell anybody and, what's more, every installation leads to many new customers as each user likes to tell his friends about how he solved his "cold-room" problem. Remember, four out of five homes have at least one cold room, so get busy now and get your share of the extra profits that are waiting for the furnace men who sell Victor Heat Boosters. Ask your jobber or write us for complete details on prices and discounts, today!

**VICTOR ELECTRIC PRODUCTS, INC.**  
841 Reading Road Cincinnati, Ohio



## SPECIFY WALTON AIR FILTERS

THEY • IMPROVE YOUR PRODUCTS  
• SERVE YOUR CUSTOMERS  
BEST

Unique Patented Design Assures



- Low Restriction
- Long Life
- Low Initial Cost
- Low Replacement Cost
- Light Weight
- High Dust Holding Capacity
- Economical Use
- High Dust Removal Efficiency

• Odorless

• Easy to Handle

**RESEARCH PRODUCTS  
CORPORATION**

Madison, Wis.

*Air Filters for Heating, Ventilating and Air Conditioning.*

## REPAIR PARTS?

... to fit every make and description of heating or cooking unit may be secured immediately upon order ... and you can bet that if it's the finest quality at a low price you are seeking. ...

**CAPITOL HAS IT!**  
**CAPITOL FURNACE AND  
STOVE REPAIR CO.**  
229 So. Meridian, Indianapolis, Ind.

## Oil Burning Furnace Design

(Continued from page 122)

Also the 1937 edition of the A.S.H.V.E. Guide (page 446) states that in the case of boilers, "A customary rule of thumb method of figuring furnace volumes is to allow 1 cu. ft. of space for a maximum heat release of 50,000 Btu. per hr." This value would correspond to approximately 66,670 Btu. input per cu. ft. of boiler furnace volume. These values for boilers are much larger than the average value of 21,000 Btu. input per cu. ft. for the oil burning, warm-air furnaces, and are probably justifiable on the basis that the heat transfer from the products of combustion to the water in the case of a steam boiler is much greater than the heat transfer from the products of combustion to the air in the case of the warm-air furnace. Therefore, with excessive rates of heat release there is much less danger of damaging the heat transfer surfaces in the case of steam boilers than there is in the case of warm-air furnaces.

### Miscellaneous Data

All except two of the furnaces were of steel construction.

In practically all cases a draft in the combustion chamber of from 0.01 in. to 0.03 in. of water was specified. The average draft loss through the furnaces was approximately 0.02 in. so that a draft of approximately 0.03 in. to 0.05 in. was specified in the smoke stack.

The tests reported in the paper entitled "Performance of Oil-Fired, Warm-Air Furnaces in the Research Residence" by Kratz and Konzo indicated that the capacities and efficiencies of oil-burning, warm-air furnaces were dependent on the quantity of air circulated over the heating surfaces. However, due to the lack of sufficient data, no tabulation was made in this survey of the quantity of air supplied with each furnace unit. The required air circulation for each furnace and for each capacity rating may be obtained by substitution of the proper numerical values in the following equation:

$$\begin{aligned} \text{C.f.m. delivery} &= \frac{\text{Bonnet Capacity in Btu. per hr.}}{\text{by fan}} \\ &\text{or,} \\ \text{C.f.m.} &= \frac{\text{Capacity in Btu. per hr.}}{1.08 ('Bon.-65)} \end{aligned}$$

in which

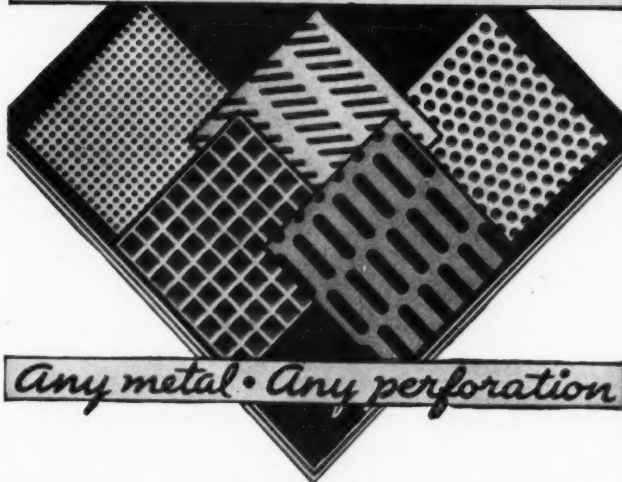
'Bon. = air temperature at bonnet in deg. F.

### Recommendations of Committee

The committee recommends that the following items should be given consideration by those manufacturers who are interested in oil burners, and oil burning furnaces in particular.

(Continued on next page)

## PERFORATED METALS



*Any metal • Any perforation*

H. & K. Perforated Metals are accurately made and embrace a great variety of perforations for use in screening, grading, ventilating and straining of different substances.

Tell us your requirements and we will send booklet showing actual sizes of perforations.

**The Harrington & King**  
**PERFORATING CO.**

5649 Fillmore Street, Chicago - 114 Liberty Street, New York



**KOL-MASTER...**

*Built for the Years Ahead*

... A PIONEER OF THE INDUSTRY  
AND STILL THE ONLY STOKER THAT  
IS OUTSTANDINGLY DIFFERENT!

... Offers you THE LARGEST, MOST  
COMPLETE LINE OF SINGLE RETORT,  
UNDERFEED, SCREWFEED STOKERS  
IN THE WORLD! Get Complete Details.

KOL-MASTER CORP., OREGON, ILLINOIS



**PREMIER  
FURNACE  
CLEANERS**  
COMPLETELY EQUIPPED

HALF HORSE POWER MODELS  
**60<sup>00</sup>** and **64<sup>50</sup>**  
ONE HORSE POWER MODELS  
**84<sup>50</sup>** and **89<sup>50</sup>**

Premier Furnace Cleaners are powerful and light weight, yet sturdily built to stand years of rugged service. Weighing less than 50 pounds, they are one-man cleaners and have been the furnace man's favorite for years. Premier Cleaners are ideal for upstairs use and may be used independently from the container for suction and blowing use in cleaning air ducts, registers, grills, radiators and air conditioning equipment.

Motor specifications for these powerful cleaners are:

1/2 H.P. maximum vacuum 31 inches in water.

1 H.P. maximum vacuum 46 inches in water.

Business-Getting, Return Post Cards are Available for Dealers at Low Cost

Buy It From Your Local Jobber or Write the Manufacturer

Furnace Cleaning Instruction Booklet Free with Each Cleaner

**ELECTRIC VACUUM CLEANER CO., INC.**

1734 Ivanhoe Road

Cleveland, Ohio

**RIVAL STRAP CORP.** 308 WEST 20th ST.  
NEW YORK, N. Y.

Rival Style "B"

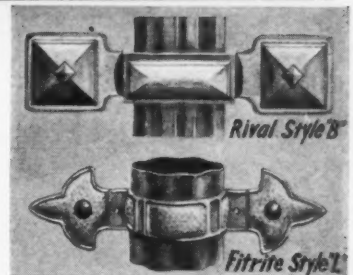
Fitrite Style "L"

One-piece Ornamental  
Leader Straps. Made in  
Copper and Zinc in six  
styles.

Pat. July 10, '28; Jan. 6,  
'31.

Sold through jobbers  
only. Write for folder showing  
complete line and sizes.

Send for free samples.



1. "FITRITE"  
ROOF STRAINERS  
6" to 12" Square—3 Types  
Bronze and Iron

2. "FITRITE" BRONZE  
BEEHIVE STRAINERS  
3", 4", 5", 6", 7", 8" Rd.  
Also 3" x 4" and 2" x 3"  
Sq.

3. "FITRITE"  
SKYLIGHT GEARING  
Iron or Bronze—1/4", 1/2",  
and 1" sizes. Made also  
for chain operation.

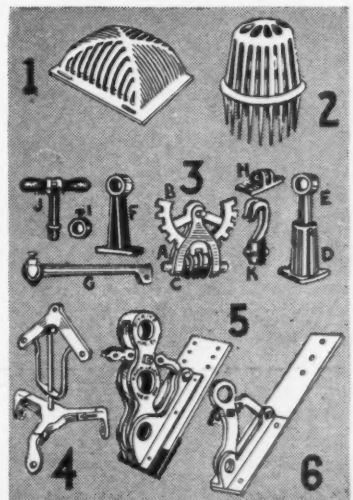
4. "FITRITE" Adjustable  
Swing Chimney Jack  
Frame. Five sizes in  
One—For 6", 7", 8", 9",  
10" Pipe.

ADJUSTABLE PIPE  
SNOW GUARDS  
Pat. Sept. 5, 1933

5. "FITRITE"  
Galvanized Iron or  
Bronze

6. "PROTECTOR"  
Bronze Only  
For smaller roofs.  
New or Old.

Write Dept. A for prices.  
To protect trade use your  
printed stationery.



**DAVID LEVOW** 308 WEST 20th ST.  
NEW YORK

*The Quality Stoker for the Mass Market*

# Peerless

**SALES**—Design—Performance — Price and Easy Payments Insure Sales.

**SATISFACTION** — Performance and Economy Mean Satisfied Customers and Eventually More Sales.

**PROFITS** — Increasing Sales Pyramid Profits and Build a Successful Business.

Outstanding beauty of design, top-quality engineering efficiency and rugged construction. Every approved stoker feature. Mechanically the best buy at any price and definitely first in eye appeal. Every home owner and even tenants of moderate means can buy a Peerless. Low price and easy payments under FHA. Write or wire for full information. A few openings for resident managers.

## THE PEERLESS MANUFACTURING CORPORATION

1411 W. Ormsby St.

Established 1884

Louisville, Ky.



Pre-eminently  
the Quality Stoker for  
the Mass Market

## METALBESTOS GAS VENT & FLUE PIPE

FULLY COVERED BY PATENTS

APPROVED BY UNDERWRITERS' LABORATORIES, INC.,  
PACIFIC COAST BUILDING OFFICIALS CONFERENCE AND  
OTHER AUTHORITIES

Thousands of installations have proven METALBESTOS to be without equal as a vent or flue for carrying off the products of combustion from gas fired appliances. It eliminates the dripping and sweating which occurs within other types of pipe.

METALBESTOS is scientifically constructed for venting gas fired appliances solely and is **SAFE — DURABLE — EFFICIENT** and **EASY TO INSTALL.**

WILLIAMS-WALLACE CO.  
160 Hooper Street  
San Francisco, Calif.

We are interested in your METALBESTOS GAS VENT and FLUE PIPE.  
Send along your catalog and price list!

NAME .....  
STREET ADDRESS .....  
CITY and STATE.....

### Item 1.

Due to the apparent confusion that exists in the industry in regard to the use of the term "efficiency" it is recommended that all ratings should differentiate between combustion efficiency and bonnet efficiency. Rating should preferably include bonnet efficiency, since that value is of greater practical importance to the installer than is the value for combustion efficiency.

### Item 2.

It is recommended that the ratings for oil-fired, warm-air furnaces should include the following items:

- Oil input in gallons per hour.
- Draft in combustion chamber in in. of water.
- CO<sub>2</sub> content of flue gas in per cent.
- Operating flue gas temperature.
- Air circulation by fan in C.f.m.
- Capacity at bonnet in Btu. per hour.
- Heat delivery at register, usually considered as 85 per cent of capacity.
- Bonnet efficiency.

### Item 3.

The only satisfactory method of obtaining the performance characteristics of furnaces is by an actual test under conditions of thermal equilibrium. In making such tests it is recommended that the procedure outlined in the "Tentative Recommended Code for Testing and Rating Oil-Fired, Fan- Furnace Combinations" be followed.

## GALVANIZED LOCK-SEAM PIPE . .



THE PIPE WITH THE BIG STRONG SEAM

Widely used for Air Conveying, Dust Collecting Systems, Smoke Stacks, Exhaust Systems, etc. 10 ft. lengths furnished in sizes from 3" in diameter and larger—14 gauge and lighter.

### • • NEW PROCESS ROLLED STEEL ANGLE RINGS

LARGE STOCK FOR QUICK DELIVERY  
IN STANDARD SIZES FROM 6" TO 36"

Larger sizes rolled when desired. Also special angles, tees, channels, bars and rods rolled in any direction, to any radius or part of a circle. On the first job you'll see the difference. These flanges are accurate in every dimension, uniform in curvature, free from distortion, and have a perfectly smooth surface that insures a tight joint.



Write TODAY for list of stock sizes and discount sheet.

**CHICAGO METAL MFG. CO.**  
3720 S. ROCKWELL ST. CHICAGO, ILL.



## IF IT'S REPAIR PARTS

to fit any Furnace, Boiler, Stove, or Air Conditioning Equipment, of any make or kind, that must fit exactly, and of course be of the finest quality, let Peninsular supply them. Buying from Peninsular is your assurance of perfect merchandise the first time and all the time . . . of immediate shipment, and prices that are right. Investigate! Try your next order with Peninsular.



**PENINSULAR**  
**STOVE COMPANY**  
2699 Grotiot Ave. Detroit, Mich.

## INCREASE PROFITS

*With*

### THE GRAND RAPIDS FURNACE CLEANER



**Powerful—One-Man Portable  
Sturdy**

The first Grand Rapids Furnace Cleaners put out years ago are still in use. Dealers say they are the best with no wear out to them.

*Free Trial—Convenient Terms  
Write for Details*

**DOYLE VACUUM CLEANER CO.**  
225 STEVENS ST., S. W. GRAND RAPIDS, MICHIGAN

## 3 TYPES OF ALLEN Turbine Ventilators for 3 Important Jobs!

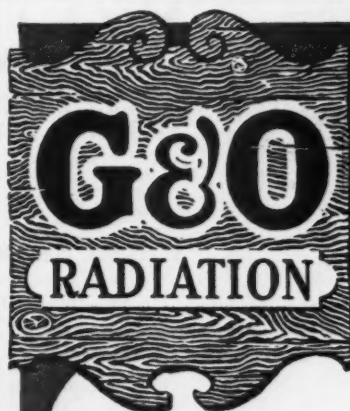
1. MULTI-VANE. The famous "Free Air" Allen Ventilator which gives cost-free powerful suction, and is the standard installation for most ventilating jobs.
2. ELECTRO-WIND. Air plus power. The same Multi-Vane ventilator, with auxiliary electric power available to double the exhaust at a trip of the switch.
3. TYPE "C." The vane-less Allen, especially designed for chimney jobs or any ventilation project where lowest cost is demanded.



ILLUSTRATING MULTI-VANES

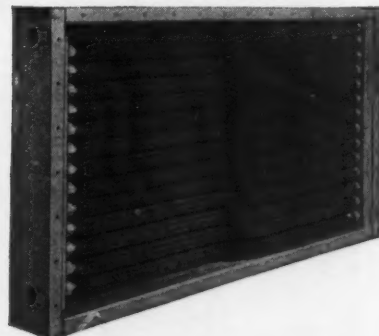
Our engineering department will assist you if desired. Let us send the latest literature on all types, for your files.

**The ALLEN Corporation**  
9752 ERWIN AVENUE DETROIT, MICH.



## FINNED COILS

G&O FINNED RADIATION COILS for all industrial applications are available in a wide range of sizes, for high and low pressure operation.



SEND  
FOR  
CATALOG

**THE G&O MANUFACTURING COMPANY**  
New Haven, Connecticut  
*Pioneer Manufacturers of Square Finned Tubing  
in the United States*

## Kruckman's Washington Letter

(Continued from page 87)

much before the nation. Defense and Mobilization are to all intents and purposes the same. One of the most troublesome factors in the actual development of the program, according to the military point of view, is the question of apprentices and mechanics. From the military viewpoint the lack of skilled mechanics and potential mechanics in the form of apprentices is one of the three great problems of defense. The military—which includes Army and Navy—realize that present economic and social conditions have caused a normal unemployment among artisans, craftsmen, and mechanics, and have created a current labor problem in the form of large numbers of presently unassimilable apprentices. But from the military side the defense program requires the creation of still larger pools of both skilled workers and apprentices. The immediate need arises from the mechanization of all armed forces. It is not generally realized that approximately one-third of the total personnel of the Army is engaged in "occupational specialist"

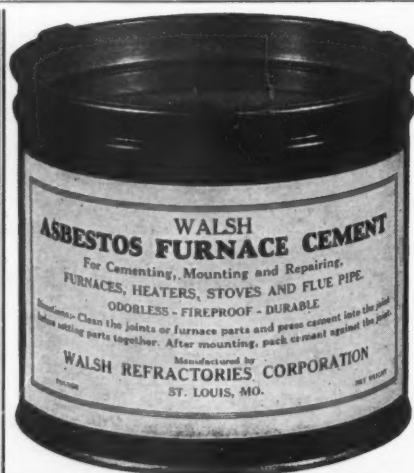
work, which means they are semi-skilled workman of all sorts along mechanical lines. For instance, men employed in the Air Corps frequently are sheet metal craftsmen familiar with steamtable work in restaurants where reasonably fine fits must be made. Sheet metal work is one of the dozen fundamental services connected with the ground-work of the Air Corps.

With 12 mechanics on the ground for every plane, it is apparent a fleet of 13,000 planes—as programmed—would mean at least 13,000 sheet metal craftsmen, (and undoubtedly many more), as well as approximately 140,000 other artisans and mechanics. The need for sheet metal workers is felt imperatively by the military gentlemen who are responsible for the Defense program. They point out that planes are not standardized, and that there is no immediate probability that they will be standardized. They feel they need sheet metal artisans, not only for the intricate handwork on planes, but for many other parts of the mechanized armed forces.

The Government, of course, may, legitimately, train mechanics for the Army. And undoubtedly a certain amount of such training is

already going on. It is known that the National Youth Administration is training aviation mechanics, and other mechanics in several schools recently opened by the Government, as well as in some centers that have been in existence almost since the enterprise was launched. The NYA denies it is training skilled workers; but the Army people make no bones about the fact that this training is in progress. The special emphasis is on aviation mechanics, which includes sheet metal workers. Up at Passamaquoddy there is a very highly equipped shop for the training of sheet metal craftsmen. In addition, as part of the mobilization program, which has been under way for some time, factories in all parts of the United States, according to the Army people, have for some time past been conducting schools for apprentices.

The gentlemen in charge of the Defense and Mobilization program are aware that this practically unlimited production of apprentices and skilled workers is in direct conflict with the economy of organized labor. The government invited John D. Lewis, head of the CIO, to speak on the problem to the Army Industrial College. Lewis indicated



## WALSH PRODUCTS

### WALSH ASBESTOS FURNACE CEMENT

Assures satisfactory furnace installations and repairs. Packed in 1, 2, 3, 5, 8 and 10 pound cans . . . also 25, 50, 100, 250, and 500 pound steel drums.

### WALSH HEARTH MIX

A superior monolithic refractory for moderate heat duty. For poured linings, special shapes, oil burner hearths, etc. Packed in 50 and 100 pound heavy bags.

### WARCO FURNACE LININGS

Highly refractory . . . uniform in size and shape . . . possessing excellent resistance to abrasion and extremely smooth surface.

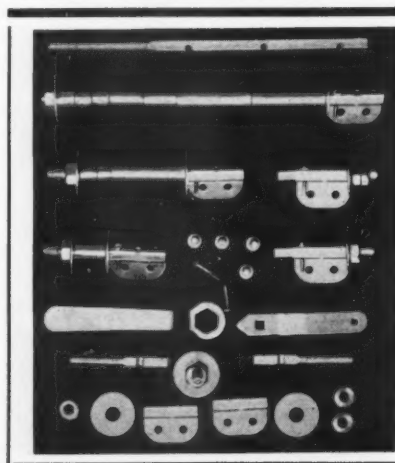
### WALSH PLASTIC FURNACE LINING

A high heat resisting fire brick in plastic form, ready for use, with outstanding working, drying and burning properties. Used extensively for repairing broken, cracked and burned-out fire pots. Packed in 5 and 10 lb. cans; 25, 50, 100, 150 and 500 lb. drums.

## WALSH REFRACTORIES CORPORATION

4430 NO. FIRST ST.

ST. LOUIS, MO.



### The New K-B DAMPER CONTROL

Here's a fool-proof, easily installed damper that will help any of your installations perform with greater efficiency.

Unique construction features separate rods and holders, making possible positive locking and no duct deforming. Adjustable for any insulation or furring. Always shows true position.

Write today for further particulars.

G. L. KERENTOFF  
2803 Jefferson Avenue  
Cincinnati, Ohio



## SPECIFIED *and* USED

—by discriminating architects, engineers and contractors because of its proven ability to withstand the rigors of weather and time. Lyonore Metal is the logical choice for a sheet metal that is but little affected by wet or dry spells, heat or cold, corrosion and time! Ask for details!

**LYON, CONKLIN & CO., Inc.**  
Baltimore, Maryland

# Lyonore Metal

CHROMIUM - NICKEL - COPPER - IRON ALLOY

## ACME "Hot Spot" WELDERS

Universally accepted as the sturdiest, easiest handled, most economical electric Spot Welder on the market.

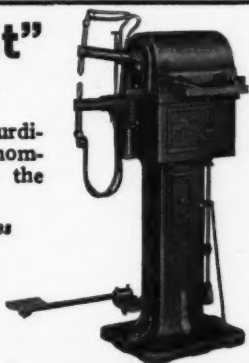
Write for literature and prices

**Don't Rivet  
SPOTWELD!  
with an ACME**  
Lifetime Guarantee!

Complete range of sizes

**ACME ELECTRIC WELDER CO.**

Distributors in principal cities  
5619 Pacific Blvd. Huntington Park, Calif.  
(Los Angeles County)



## CHECK YOUR HEATING INSTALLATIONS

WITH THE

## "ALNOR" VELOMETER



This all-purpose air velocity meter indicates air velocities directly and instantaneously on the scale in f.p.m. without the necessity of timing or mathematical calculations. Standard range 0-300, 0-3000 f.p.m. Other ranges available up to 18,000 f.p.m.

Write us today for a folder giving more complete information.

**ILLINOIS TESTING LABORATORIES, INC.**  
412 N. LaSalle Street Chicago, Illinois

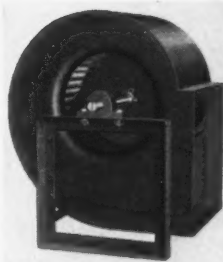
## Air Conditioning

- What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?
- Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly Air Conditioning Section of **AMERICAN ARTISAN**.

If you do not now get the **ARTISAN**, send us \$2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

**AMERICAN ARTISAN**  
6 North Michigan Ave. Chicago, Ill.



## BLOWERS

We Serve the West and Build the Best

Manufacturers of:

**BLOWERS**  
**AIR WASHERS**  
**DE-POLLENIZERS**  
**SLUMBERETTE** night air fan units  
**EVAPORATIVE COOLING UNITS**  
**FURNACE BLOWER FILTER UNITS**

We specialize in blowers for furnace manufacturers. Built to specifications.

The Todd "Cascade" Evaporative Cooling Unit incorporates a new proven method of adiabatic cooling.

Dynamically Balanced Wheels.

Write for details.

## TODD AIR CONDITIONING COMPANY

Incorporated

BONNER SPRINGS, KANSAS

## How to Sell Furnaces and Repairs WITH

## The TORNADO Furnace Cleaner



The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too!

Dealers say that the TORNADO is the most powerful furnace cleaner built. Leads the field! Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Thousands in use.

Write now for complete information.

**Breuer Electric Mfg. Co.**  
5082 Ravenswood Avenue, Chicago, Ill.

## "OK" say Leading Stainless Steel Fabricators

Day after day the country's leading stainless steel fabricators put the stamp of approval on Ruby's Stainless Steel Soldering flux for its fine performance and unwavering satisfaction. Back of this universal O.K. is the fact that Rubyfluid Soldering products have kept abreast of the industry soldering problems. For prices see your jobber or write direct

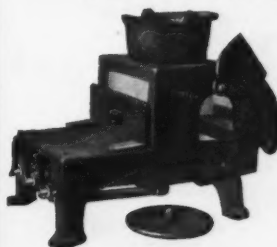


**RUBY CHEMICAL CO.**  
74 McDOWELL ST., COLUMBUS, O.



# Rubyfluid

## JOHNSON NO. 118 COMBINATION BENCH FURNACE Ideal for Every Shop Use



Here is a powerful bench furnace with many exclusive features for doing all kinds of heating jobs efficiently. Designed to handle largest soldering coppers; refractory-lined for perfect heat-treating and case-hardening. Side doors allow heating rods, removable pot melts 22 lbs. lead or low-fusion alloys. Three Patented Johnson Direct-Jet Bunsen Burners develop intense heat without expensive blower or forced air-blast. Write for free catalog now!

**JOHNSON GAS APPLIANCE CO.**  
Cedar Rapids IOWA



his attitude by declining in unqualified terms. President Green of the AFL, also invited, simply ignored the bid. It is the military idea, however, that war-time need of skilled workers in the armed services, and in the industries immediately supporting the armed forces, will be so pressing that the situation created by the present bogging down of the apprentice system, and the unemployment of skilled workers, in the end must probably be ignored.

Mobilization-defense is not quite the theoretical matter the average person assumes. For several years past the military have surveyed the potentialities of thousands of industrial plants for wartime service. They know exactly what the plants are able to do, their human equations, and their expansive potentialities. Over 20,000 plants in all parts of the country have been surveyed, and over 10,000 have been chosen for specific tasks. In addition many more thousands have been classified and appraised. There is not one plant or shop, large or small, in any part of the United States, that is not known thoroughly to the military people of the U. S. It is the business of the Mobilization group in each region to know the

resources of their region to the last item.


#### Industry Organized for War

The plan is that industry, like the armed forces, shall be potentially ready when M-Day comes. M-Day is military slang in the United States for Mobilization Day. Officers of our military establishments roll the phrase on their lips much as the German officers used to speak of Der Tag. Industry is being rehearsed in its part almost in the same way as the armed forces are being rehearsed when they take part in the war-games. Several years ago the Congress gave the army \$10,000,000 to be spent at the rate of \$2,000,000 each year to "educate" industry. The fund is almost spent. The Army is asking for a lump sum of \$33,000,000 in the next appropriation, to be spent for the same purpose, when and how it may determine. Part of this fund will undoubtedly be expended upon experimental equipment to be made by factories and shops in all parts of the country. The work will be paid for on the Cost-Plus basis. The usual plus is 10% of the cost.

All this work is being conducted under the general supervision of

Army officers trained in the Army Industrial College. Over 7,000 Army, Navy and Marine Corps officers have been educated in this College during the past 17 years. They are drilled in the essentials of industrial and business economics by the faculty of the Harvard School of Business Administration. They learn about the actual management and operation of the various industries by lectures from such leaders as the head of the American Telephone and Telegraph Company, the General Motors, and similar organizations. And for their final work they go into the factories, foundries, shops, and offices, of the various industries and learn all phases of the business. These men will handle the organization of the technical workmen in the armed forces, and will conduct the business of war behind the lines. In all probability they will supervise all industry and business when the next war comes. For, the next war will be unlike all wars that have gone before in the fact that all the population will be mobilized, either in the armed forces or at home. It is realized that probably 75 per cent of the successful eventuation of a war depends upon the mobilization of all forces behind the lines.

**Check In**  
**AT DE WITT OPERATED HOTELS**



The Hotels that Check  
with Every Travel Standard

In Cleveland • HOTEL HOLLANDEN  
In Columbus • THE NEIL HOUSE  
In Akron • THE MAYFLOWER  
In Toledo • THE NEW SECOR  
In Jamestown, N. Y. • THE SAMUELS  
and THE JAMESTOWN

Theodore De Witt, President  
R. F. Marsh, Vice-President

**DEWITT  
OPERATED  
HOTELS**

**IN NEW YORK**



"A  
GREAT  
HOTEL"

**LARGE ROOMS, NEWLY  
FURNISHED & DECORATED  
SINGLE from \$3. DOUBLE \$4.50  
THREE POPULAR PRICED  
RESTAURANTS**

**1 BLOCK FROM PENN. STATION  
B. & O. Motor Coaches stop at our door.**

**HOTEL McALPIN**

**BROADWAY AT 34th ST., NEW YORK**  
Under KNOTT Mgt. John J. Woelfle, Mgr.

## A Clean Furnace Provides Better Heat . . . and Greater Profits To You . . .

There's more Profit for you on every installation with this new Schaefer Flue or Furnace Brush. Your customer will enjoy a cleaner furnace, for it means better heating efficiency and comfort, greater fuel savings—complete satisfaction.

The new Schaefer Flue and Furnace Brushes are designed for this extra service—through many long years of use. Their fast-cleaning wire bristles are entirely RUSTPROOF, made of special Silver Britte alloy spring steel.

Here's a Quality Brush that sells fast—at a profit to you—and guards your reputation as a careful Heating Engineer. Write NOW for NEW CATALOG on complete Schaefer Line of Flue and Furnace Brushes.



**SCHAEFER BRUSH MFG. COMPANY**  
117 W. Walker Street  
Milwaukee, Wis.

**SCHAEFER BRUSHES**  
BUY SCHAEFER-IT'S SAFER

## Stop guessing — Get all facts about heating conditions!

● You should never guess about heating conditions when you sell or service a heating plant! Use a Practical Recording Thermometer and get the facts. Records temperatures night and day. Gives reliable records in ink on 24 hour charts. Approved by heating engineers. Portable and easy to use as an alarm clock. Only 7½ in. high. Sturdily built, low in price, and guaranteed. Write for complete information, price, and 15 Day Trial Offer. Ask your supplier or write to Practical Instrument Company, Dept. D, 2717 N. Ashland, Chicago.



**NOW**

**USE PRACTICAL THERMOMETERS  
BUY FROM YOUR SUPPLIER**

## GRAY'S FULL SIZE BLUE PRINT PATTERNS

45 DEGREE BRANCH PATTERNS IN 2 SETS

SET No. 3—2 in. to 12 in. branches on 2 in. to 30 in. diameter.....\$5.00

SET NO. 4—12 in. to 24 in. branches on 12 in. to 48 in. diameter..... 5.00  
385 patterns in the two sets.

ELBOW PATTERNS:

SET No. 1—1 in. to 20 in. 2-3-4-5-6-7 piece, including Tee patterns 2 in. to 20 in. diameter. 152 patterns \$2.50.

SET No. 2—20 in. to 40 in. 5-6-7-8-9 piece and angle chart showing what pattern and number of pieces to get required angle. 105 patterns \$2.50.

SKYLIGHTS.

Hip, gable and single pitch, putty bar ● Hip, gable and single pitch, puttyless, with square ridge vent and base patterns. \$5.00 each.

Turret lights to operate by gearing. \$3.00. Louvres—stationary and to operate. \$3.00. Roof ventilators and base patterns. \$5.00. Ship ventilators—6 piece 4 in. to 24 in. at base.

Patterns sent postpaid upon receipt of P. O. order or check.

**G. L. GRAY, 507-511 Grand Avenue, NEW HAVEN, CONN.**  
Write for pattern circular giving full information.  
Mention American Artisan.



**ST. LOUIS'  
FINEST  
HOTEL**



AT THE CENTER OF THINGS

RATES FROM  
.... \$3.00

**CORONADO  
HOTEL**  
SPRING AT LINDELL  
SAINT LOUIS MISSOURI

Preston J. Bradshaw, Director

FOUR FAMOUS  
RESTAURANTS

**NOW  
AT LAST!**

## FAST PRODUCTION SPOT WELDING

**Extra Large Transformers  
Advanced Transformer Construction**

Canatsey SpotWelders assure quick action, improved welds and do not break down under heavy overload. Ideal for assembling sheet metal, wire and similar materials. Convenient to adjust for electrode pressure and contact time. Trip Type Switch. Enclosed heat regulating switch made in four sizes.

Write for Descriptive Literature and Prices

Many profitable territories still open for distribution. Liberal discounts. Write for full details.

**CANATSEY ELECTRIC MFG. CO.**

620 Wyandotte

Kansas City, Mo., U. S. A.  
Cable address CEMCO



*Easy and Convenient  
to order from Des Moines all*

## STOVE, FURNACE and BOILER REPAIR PARTS

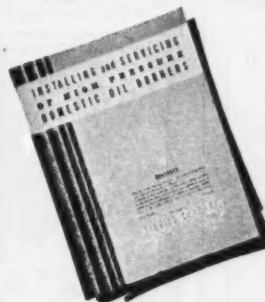
*Accurate patterns — Quality castings  
speedy, correct and complete service.*

**-MODERNAIRE FURNACES**

*Fittings, Registers, Blowers, Supplies*

**DES MOINES STOVE REPAIR CO.**  
DES MOINES, IOWA

## How To Install And Service Oil Burners



Oil Burner dealers are being given an opportunity to get a single copy free of a new book that should prove of great assistance to Oil Burner Dealers and Service men—"Installing and Servicing of High Pressure Domestic Oil Burners." The book gives step by step directions on how to install, service, and maintain; valuable hints, avoidance of trouble, etc. Additional copies, each \$2.00.

**\$2.00** prepaid

**P. O. BOX 794  
PEORIA, ILLINOIS**

## PORTABLE SHEARS

ALL-ALLOY



ALL-ALLOY No. 2 cuts up to ¼" steel plate.

ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.

Special blades may be had for shearing stainless steel.

**FULLY GUARANTEED**

**BREMIL MFG. CO. Erie, Pa.**



# AMERICAN ARTISAN Service Section

## AUTOVENT

"The Complete Line" of  
FANS - BLOWERS - UNIT HEATERS



"31 Series" PROPELLER FANS  
Exclusive AUTOVENT non-overloading and non-churning Propeller fans. Sturdy—economical — efficient — certified ratings! Also acid-moisture proof and vapor-explosion proof units. Write for bulletins Nos. 200, 201.



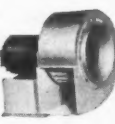
"B W" (Bucket Wheel) FANS  
When occasion demands a bucket wheel type propeller fan — be sure to specify AUTOVENT. Superior materials, workmanship and certified ratings make it the best competitive "buy" on the market. All sizes! Write for bulletin No. 202.



COOLVENT ATTIC FAN  
A new ventilating system that does a comfort cooling job comparable to some high priced refrigeration plants. Inexpensive, economical, quiet operating, built for years of trouble-free service! Certified ratings! Write for bulletin No. 204A.



Automatic LOUVRES  
Special AUTOVENT design provides weather protection for fan equipment and eliminates back-drafts. Sturdy construction; automatic operation; available in rectangular or round styles. A size for every requirement. Write for bulletin No. 205.



VOLUME BLOWERS  
For economical, long-lived, duct ventilation install UNIBLADE Volume blowers. "The Complete line" consists of all size variations and universal discharges. Wheels from 6" to 75" diameter. Certified ratings. Write for bulletin Nos. 300, 301.

AUTOVENT Propeller Fans and Blowers are tested and rated in accordance with test code adopted by National Ass'n of Fan Mfrs., and American Soc. of Heat & Vent. Eng's.

**AUTOVENT FAN & BLOWER CO.**  
1807-19 N. Kostner Ave., Chicago, Illinois

## POSITION WANTED

MAN WITH EXTENSIVE EXPERIENCE AS SALES MANAGER OF NATIONALLY KNOWN WARM AIR FURNACE AND RESIDENTIAL AIR CONDITIONING MANUFACTURER. Possess excellent national knowledge of this industry. Have good understanding of equipment and fuels used in the various markets. Large national acquaintance with jobbers and dealers, their problems and educational and promotional methods required to stimulate their business. Am well acquainted with costs and selling prices. Have good knowledge of oil and gas burners, stokers and oil burning space heaters and background of radiator heating. Can give proof of my ability to produce a volume of business at a profit. Address Key No. 453, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

## A REAL TIME and MONEY SAVER

Modernaire Heat Rule is designed for simplifying the engineering of forced air and gravity heating installations. Nothing complicated, easy to use, exact and can be used anywhere. Removes guess work. Write today for yours. Only \$1.00, complete with instructions and data sheets.

**MODERNAIRE ENGINEERING COMPANY**

107 S. W. 2nd AVE., DES MOINES, IA.

## SHAMBLÉN SERVICE

is known throughout the trade. Your order filled when and how you want it and with parts that are guaranteed to fit.

Try us with your next repair job. Our service and repair parts cannot be excelled. No order too large, none too small. Write today for catalog and further particulars.

**SHAMBLÉN FURNACE PARTS COMPANY**  
231-39 First Avenue Pittsburgh, Pa.

## JUST PUBLISHED!

The New, Enlarged 2nd Edition  
of Platte Overton's

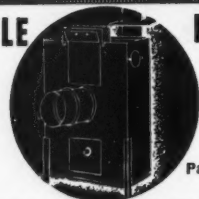
### "Forced Air Heating"

215 pages—Cloth Bound—\$2.00

This new edition provides all the information needed by the contractor to enable him to design and install any forced air heating system correctly. It includes a brand new data sheet and shows how to fill it in. It outlines step by step a design procedure which may be applied to any job, and contains all the charts, tables, diagrams and formulas necessary. Send \$2 for your copy today.

**KEENEY PUBLISHING CO.**  
6 N. Michigan Ave., Chicago, Ill.

## HOWLE HEAT



Patented

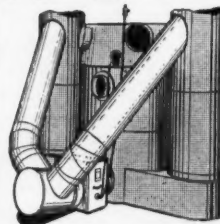
### EXTRACTOR

The Howle Heat Extractor is an inexpensive unit installed between the furnace and the stack to prevent the escape of moisture-laden corrosive gases and to redirect and radiate into the basement the heat which would pass up the stack as waste. This "reclaimed" heat will make any heating plant more efficient. Ask Condensation Engineers for full details.

**CONDENSATION ENGINEERING CORPORATION**  
335 S. Western Ave., Chicago, Illinois

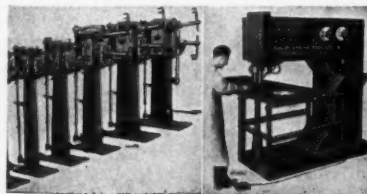
## A-C THERMOSTATICALLY CONTROLLED AUTOMATIC

### HEAT BOOSTER



Everything the Home Owner wants in a Furnace Fan—At a price Every Furnace Owner Can Afford to Pay.

Write Today or See Your Jobber  
**A.-C. MANUFACTURING CO.**  
PONTIAC ILLINOIS



Electric welding equipment of every description to weld from a watch case to a door. Also special welding machines, spot, butt, seam, a. c. arc welders in sizes from 1/4 to 500 KVA. Ask for our catalog No. 38-WT. Also production job welding.  
**EISLER ENGINEERING CO., Inc.**  
761 S. 13th St. NEWARK, N. J.



### "DO-ALL" Combination Electric Hammer & Drill

drills both concrete and metal. Cap. 1 1/4" in concrete—3/4" in metal. Saves time and money in setting expansion bolts, anchors and plugs. Soon pays for itself. Easy to maintain. Bulletin 381. Wodack Electric Tool Corporation, 4644 W. Huron St., Chicago, Ill.

### JOHNSON'S

#### NEW HANDY MANUAL

OR

#### HEATING, VENTILATING MECHANICAL REFRIGERATION

and

#### AIR CONDITIONING

432 pages of practical, condensed information, tables, rules and diagrams. Price \$1.00—Remit with order to

**KEENEY PUBLISHING COMPANY**  
6 N. Michigan Ave., Chicago, Ill.

## 1/4" RIBBED WIRE GLASS

Shipments anywhere F.O.B. our warehouse. 13c per sq. ft. plus boxing. Stock Sheets—Case lots.

Quotations on cut sizes on application.  
**T. J. ATCHESON GLASS CO.**  
955 MAIN STREET BUFFALO, N. Y.

**SERVICE SECTION:** Rates for display space similar to above in Service Section are \$5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. Cash must accompany order.



# AMERICAN ARTISAN Service Section

## ACE SPOT WELDERS

For economically assembling sheet metal parts and parts made of wire.

CHEAPER THAN  
RIVETING

AVERAGE COST  
OF CURRENT  
FOR 1,000 SPOT  
WELDS ONLY 3c

Built for production service.  
Engineered to meet the practical requirements of sheet metal shops. Available in sizes from 5 K. W. up.

Send today  
for Free Literature.

**PIER EQUIPMENT MFG. CO.**

Welding Equipment Division  
728 Cross St., Benton Harbor, Michigan

# Classified

## SITUATIONS OPEN

**HEATING SALESMEN WANTED** — We have openings for five thoroughly experienced heating salesmen. Do not apply unless your experience covers calculating heat losses, laying out forced air heating systems, servicing coal, oil and gas fired units. Address The Rudy Furnace Company, Dowagiac, Mich.

Furnace and Heating Accessory Salesmen who call on dealers to sell a new improved line of Air Conditioning Registers as well as Floor Goods on straight commission exclusive territories. Our own salesmen know of this ad. Address Key 452, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

**WANTED:** first class mechanic for Southern Minnesota shop specializing in outside sheet metal work and roofing, capable of becoming foreman. Will guarantee at least \$2,000 yearly to start. Good opportunity for a live wire. Address Key No. 451, American Artisan, 6 N. Michigan Ave. Chicago, Ill.

The American Artisan Service Section presents a golden opportunity to contact a national circulation at comparatively small cost. Manufacturers can use it to make any article sell and dealers will find it an inexpensive way to contact a live buying trade. Don't delay—send in your copy now for the next issue. See bottom of page for rates.



## BEVERLY THROATLESS SHEARS

are indispensable to the modern, up to date sheet metal shop. Light, portable, yet extremely strong, they will make your shearing operations much faster, neater and more economical thru time saved on the job. They are made in two sizes to handle up to 14 or 16 gauge metal and are very reasonably priced.

Write today for literature and prices.

**BEVERLY SHEAR CO.**

3009 W. 110TH PLACE, DEPT. S, CHICAGO



Now, men, you can have a Practical Crimper!

## CHAMPION DRAW ACTION PIPE CRIMPER

Length—14 Inches. Weight—one lb. 10 oz.

Crimps plain round, square and rectangular pipe—quickly, perfectly and easily. Can be used in the shop or carried conveniently in the tool kit to outside jobs. Appreciated by those who install warm air furnace pipe, wall stacks, air ducts, smoke, conductor and water heater vent pipe, etc. Price, \$2.50 f. o. b. Factory.

Jobbers and Installers: Write for full details today.

**CHAMPION TOOL COMPANY**

376 West 41st Place, Los Angeles, Calif.

**THE Cold Room** problem can be solved by using a **One Pipe Booster Fan** to force warm air into the room. May also be used in cold air returns. Easily installed. Made in all sizes. Furnished either with plain mounting or encased, as illustrated. Variable speeds may be had by using our **Control Box** which fits any model **Booster Fan** since 1933.



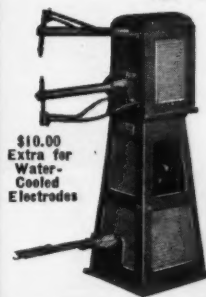
Write for prices and literature.

**Brumme Manufacturing Co.**

314 S. Artesian Ave. Chicago, Ill.

## BEST BY TEST!

TRY IT!



## NEW IDEAL SPOT WELDER

Floor Type

7½ K.W. (10 KVA)

18" arms, 3 pieces

14 ga. ....\$150.00

10 K.W. (13 KVA)

24" arms, 2 pieces

¾" .....\$185.00

Here is YOUR opportunity to buy a New Spot Welder at a Used Price. Immediate stock shipment, subject to prior sale.

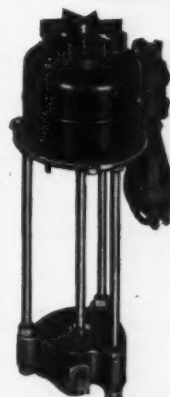
## INTERSTATE

Machinery Co., Inc.

107 S. Clinton St., Chicago (Free Parking)

## EQUIPMENT FOR COOLERS

EVAPORATIVE TYPE



## ESKIMO Recirculating PUMP . . .

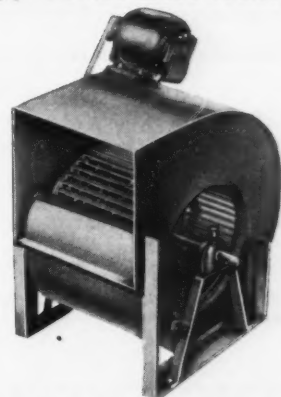
This small vertical centrifugal pump is direct connected to motor equipped with cooling fan.

Capacity: 1 G.P.M. against 8 ft. head.

Pump and impeller of cast bronze. Motor shaft stainless steel.

Size: 9½" high; diam. mounting ring 3¼". Weight 5 lbs.

## ★ STAR BLOWERS



This model has special mounting for evaporative coolers. Streamlined. Wheels tested for dynamic balance.

Wheel sizes: 9", 10", 12", 15", 17", 20".

Write for catalog and prices.

## STAR RADIATOR CO.

Manufacturers

649 Ceres Ave.

Los Angeles, Calif.

## IT'S CHIMNEY TOP TIME

Accurate Revolving Ventilators, used with the Accurate Cast Base make Good Chimney Tops. Simple in Design. Durable in Construction. Storm and Rain Proof. Positively Prevents Down Draft. Certified Ratings. Popularly Priced. See Your Jobber.



The Accurate Unit stops down drafts on oil and gas fired units.

## ACCURATE MFG. WORKS

2336-38 MILWAUKEE AVE. CHICAGO, ILL.

**SERVICE SECTION:** Rates for display space similar to above in Service Section are \$5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. Cash must accompany order.

*"Genuine  
Detroit"*

# CONTROLS

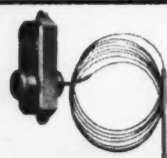
## WHERE IT IS USED

## WHAT IT IS

## WHAT IT DOES

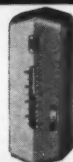
In low voltage circuit for summer air conditioning installations.

No. 691  
Differential  
Thermostat



Automatically controls operation of cooling unit to maintain a specified difference between indoor and outdoor temperatures. Prevents "Over-Cooling."

In low voltage control circuits of heating and air conditioning installations.

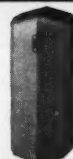


Two  
Eleven Room  
Thermostat

Controls operation of burner motor, Solenoid Valve, damper motor, or Thermotor gas valve in accordance with changes in room temperature.

In low voltage control circuits of air conditioning or humidification installations.

No. 197  
Humidistat



Controls the operation of solenoids, motor operated valves, damper motors, relays, heaters, compressors or fans in accordance with changes in humidity.

In the liquid or suction line of refrigerating units and in the water supply line of humidifiers.

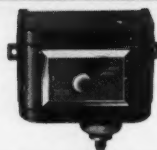


No. 683-R3  
and 683-W3  
Solenoid Valves

Controls the flow of refrigerant or the flow of water in response to action of thermostat, pressure switch or humidistat.

In commercial refrigeration and air conditioning systems.

No. 450  
Series Controls for  
Refrigeration



Controls operation of compressor in accordance with changes in temperature, pressure or vacuum. Available with or without high pressure cutout.

On hot water or steam pipes or tanks.



No. 251  
Clamp On  
Limit Control

Controls burner, circulator or motor in accordance with temperature changes. Steam and warm air models also available.

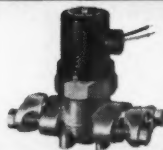
In liquid line to evaporator coil of cooling and refrigeration installations.

No. 673  
Thermostatic  
Expansion Valve



Keeps evaporator full of refrigerant at all times, avoids temperature lag and guards against motor overload when starting up a warm system.

Large capacity valve for refrigeration liquid or suction lines or water supply lines.



No. 686  
Solenoid Valve  
(large capacity)

Controls flow of refrigerant or water. Operated by pressure, temperature or humidity control.

In liquid line to evaporator coil of refrigeration and air conditioning installations.

No. 781  
Thermostatic Expansion  
Valve (large capacity)



Keeps the coil completely refrigerated, avoids temperature lag and protects against motor overload when starting up a warm system.



**DETROIT LUBRICATOR COMPANY**

General Offices: DETROIT, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

Canadian Representatives: RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg



---

Section of  
JANUARY, 1939  
**AMERICAN ARTISAN**

**1939**  
**DIRECTORY**

OF WARM AIR HEATING, RESIDENTIAL AIR  
CONDITIONING AND SHEET METAL PRODUCTS

Section 1.—Products Classified

Section 2.—Trade Names

Section 3.—Manufacturers' Addresses

**HOW TO USE THIS DIRECTORY**

If you want to know the names of one or more manufacturers making a certain product, look in Section 1, where that product will appear in its proper place in the listing. If you have the trade name of a product and want to know who manufactures it, look in Section 2, where trade names are alphabetically listed. For the complete name and address of any manufacturer, look in Section 3.

● The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 168, for the page on which you will find the advertising of any of these manufacturers.



# Index to Advertisers

*Firms represented in this issue are identified by the folio of the page on which their advertising appears.*

A-C Manufacturing Co.....164  
Accurate Mfg. Works.....165  
Acme Electric Welder Co.....161  
Air Controls, Inc.....44  
Allen Corp. ....159  
American Air Filter Co., Inc... 90  
American Fdry. & Furnace Co..138  
American Furnace Co. ....41  
American Gas Products Corp.. 50  
American Radiator Co. ....47  
American Rolling Mill Co., The 62  
A. S. H. & V. E. ....60  
Anthracite Industries, Inc.... 42  
Armstrong Co., The.....141  
Atcheson Glass Co., T. J.....164  
Auer Register Co.....100  
Automatic Humidifier Co.....130  
Autovent Fan & Blower Co....164

Baker Ice Machine Co., Inc.... 56  
Barber Gas Burner Co., The... 18  
Bead Chain Mfg. Co.....38  
Berger Bros. Co.....155  
Beverly Throatless Shear Co..165  
Blake & Johnson Co.....154  
Blocksom & Co.....153  
Brauer Supply Co., A. G.....40  
Bremil Mfg. Co.....163  
Breuer Electric Mfg. Co.....161  
Brumme Mfg. Co.....165  
Buffalo Forge Co.....43

Calesco Corp. ....155  
Canatsey Elec. Mfg. Co.....163  
Capitol Furnace & Stove Repair Co. ....156  
Central Furnace & Stove Repair Co. ....155  
Century Electric Co.....37  
Champion Tool Co.....165  
Chandler Co. ....149  
Chicago Metal Mfg. Co.....158  
Cincinnati Sheet Metal & Roofing Co. ....152  
Clarage Fan Co.....124  
Condensation Engineering Corp..164  
Cook Electric Co.....139  
Coronado Hotel .....163  
Crescent Tool Co.....45  
Curtis Refrigerating Machine Co. ....143

Dail Steel Products Co.....145  
Des Moines Stove Repair Co..163  
Detroit Lubricator Co.....166  
De Witt Hotels.....162  
Doyle Vacuum Cleaner Co....159  
Dreis & Krump Mfg. Co.....52

Eisler Engineering Co.....164  
Electric Vacuum Cleaner Co., Inc. ....157  
Elgo Shutter & Mfg. Co.....153  
Excelsior Steel Furnace Co....149

Fitzgibbons Boiler Co.....35  
Fox Furnace Co., The....6 and 7  
Friez & Sons, Julien P.....151  
Furblo Co. ....65

G & O Mfg. Co.....159  
Gleason-Avery, Inc. ....145  
Gray, G. L.....163

Harrington & King Perforating Co. ....157  
Hart & Cooley Mfg. Co.....8  
Henry Furnace & Foundry Co., The .....61  
Hess-Snyder Co. ....143  
Hess Warming & Ventilating Co. ....154  
Hotel McAlpin .....162  
Hussey & Co., C. G.....22

Illinois Testing Lab., Inc.....161  
Independent Register Co., The. 59  
International Nickel Co., Inc... 5  
Interstate Machinery Co.....165

Johnson Co., S. T.....141  
Johnson Gas Appliance Co....161

Kerentoff, G. L.....160  
Kol-Master Corp. ....157

Lamneck Products, Inc.....  
.....Inside Front Cover  
Lau Blower Co.....58  
Levow, David .....157  
Lochinvar Corp. ....106  
Lockformer Co. ....147  
Lyon-Conklin & Co., Inc.....161

Maid-O'-Mist, Inc. ....3  
Malleable Iron Fittings Co....137  
Maurey Mfg. Co.....49  
Mercoid Corp. ....105  
Meyer & Bro. Co., F....11 and 14  
Meyer Furnace Co.....12 and 13  
Michigan Tank & Furnace Co..118  
Milcor Steel Co.....  
.....Outside Back Cover  
Minneapolis-Honeywell Regulator Co. ....9  
Modernaire Engineering Co....164  
Monmouth Products Co.....33  
Mueller Furnace Co., L. J.....  
.....24 and 25

Niagara Machine & Tool Works 51  
Northwestern Stove Co.....30

Osborn Co., J. M. & L. A....20

Pacific Gas Radiator Co.....57  
Parker-Kalon Corp. ....55  
Peerless Electric Co. ....34

Peerless Foundry Co. ....19  
Peerless Mfg. Corp. ....158  
Peninsular Stove Co.....159  
Pier Equipment Mfg. Co.....165  
Practical Instrument Co.....163  
Premier Division, Electric Vacuum Cleaner Co., Inc.....157  
Premier Furnace Co.....123  
Pyrolite Products Co.....136

Randall Graphite Products Corp..129  
Register & Grille Mfg. Co....146  
Republic Steel Corp.....66  
Research Products Corp.....156  
Rock Island Register Co.....137  
Round Oak Co., Inside Back Cover  
Ruberoid Co., The.....148  
Ruby Chemical Co.....161  
Rybolt Heater Co.....26  
Ryerson & Son, Inc., Joseph T. 15

S. K. F. Industries.....21  
St. Louis Furnace Mfg. Co.....63  
Sall Mountain Co.....144  
Schaefer Brush Co.....163  
Schwitzer-Cummins Co. ....112  
Scovill Mfg. Co.....150  
Scully Steel Prod. Co.....28  
Shamblen Furnace Parts Co....164  
Skilsaw, Inc. ....139  
Skuttle Co., J. L.....117  
Standard Stamping & Perf. Co..152  
Stanley Works .....31  
Star Radiator Co.....165  
Superior Sheet Steel Co.....46  
Swartwout Co., The.....32

Todd Air Cond. Co.....161  
Trane Co., The.....27  
Tuttle & Bailey, Inc.....23  
Twentieth Century Heating & Ventilating Co. ....160

U. S. Register Co.....16 and 17  
Universal Cooler Co.....147  
Utility Fan & Blower Corp....10

Victor Electric Products, Inc..155  
Viking Air Cond. Corp.....29

Walsh Refractories Corp.....160  
Ward Machinery Co.....53  
Waterloo Register Co.....39  
Waterman-Waterbury Co., The.111  
White Mfg. Co.....99  
Whitney Mfg. Co., W. A.....140  
Whitney Metal Tool Co.....135  
Williams-Wallace Co. ....158  
Wilson, Inc., Grant.....142  
Wise Furnace Co.....54  
Wiss & Sons Co., J.....36  
Wodack Elec. Tool Corp.....164

XXth Century Heating & Ventilating Co. ....160

Youngstown Sheet & Tube Co.. 48

Section of  
**American Artisan**  
**1939 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL  
AIR CONDITIONING AND SHEET METAL PRODUCTS**

[ **Section 1—PRODUCTS CLASSIFIED** ]

● The manufacturers whose names are dotted throughout the listing advertise their products in this issue. Turn to Index to Advertisers, page 168, for the page on which you will find the advertising of any of these manufacturers.

**AIR CONDITIONING UNITS, CENTRAL SYSTEM,  
BOILER TYPE, SUMMER**

(Self-contained fan, filter and cooling coil unit for connection to refrigerating compressor or cold water supply)

- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Blower Corp., Detroit, Mich.
- American Radiator Co., New York City
- Apex Rotarex Corp., Cleveland, O.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Betz Air Conditioning Corp., Kansas City, Mo.
- Brundage Co., Kalamazoo, Mich.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Electrol Incorporated, Clifton, N. J.
- Fedders Mfg. Co., Buffalo.
- Fitzgibbons Boiler Co., Inc., New York, N. Y.
- Frick Company, Waynesboro, Pa.
- General Refrigeration Corporation, Beloit, Wis.
- Johnson Co., S. T., Oakland, Cal., and Philadelphia, Pa.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Pernot & Rich, Inc., Los Angeles.
- Research Corp., New York City.
- Rempe Co., Chicago.
- Trane Co., La Crosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Utica Radiator Corp., Utica, N. Y.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- York Ice Machinery Corp., York, Pa.

**AIR CONDITIONING UNITS, CENTRAL SYSTEM,  
BOILER TYPE, WINTER**

(Self-contained fan, filter, humidifier and heating coil unit for connection to steam or hot water boiler)

- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Blower Corp., Detroit.
- American Gas Products Div. of American Radiator Co., New York City.
- American Radiator Co., New York City.
- Apex Rotarex Corp., Cleveland.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Betz Air Conditioning Corp., Kansas City, Mo.
- Brundage Co., Kalamazoo, Mich.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, Ohio.
- Easternoll, Inc., Portland, Maine.
- Electrol Incorporated, Clifton, N. J.
- Fedders Mfg. Co., Buffalo.
- Fitzgibbons Boiler Co., Inc., New York City.
- Harvey-Whipple, Inc., Springfield, Mass.
- Johnson Co., S. T., Oakland, Cal., and Philadelphia.
- Lynn Products Co., Lynn, Mass.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Pernot & Rich, Inc., Los Angeles.
- Synco-Flame Burner Corporation, Willimantic, Conn.
- Trane Co., LaCrosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- United States Radiator Corp., Detroit.
- Utica Radiator Corp., Utica, N. Y.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**AIR CONDITIONING UNITS, CENTRAL SYSTEM,  
FURNACE TYPE, SUMMER**

(Self-contained fan, filter and cooling coil unit for connection to refrigerating compressor or cold water supply and for use in combination with a warm air furnace)

- American Foundry & Furnace Co., Bloomington, Ill.
- Atlas Heating & Ventilating Co., Ltd., San Francisco.
- Brundage Co., Kalamazoo, Mich.
- Campbell Heating Co., Des Moines, Ia.
- Carrier Corp., Syracuse, N. Y.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, Ohio.
- Forest City Foundries Co., Cleveland.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Pernot & Rich, Inc., Los Angeles.
- Star Radiator Co., Los Angeles, Cal.
- Utica Radiator Corp., Utica, N. Y.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Waterman-Waterbury Co., Minneapolis.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**AIR CONDITIONING UNITS, ROOM TYPE, SUMMER  
(Floor or suspended for cooling, dehumidifying, circulating and cleaning)**

- Airgard Manufacturing Co., Chicago, Ill.
- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Blower Corp., Detroit, Mich.
- American Gas Products Div. of American Radiator Co., New York City.
- Apex Rotarex Corp., Cleveland, O.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Corozone Air Conditioning Corp., Cleveland, O.
- Crystal Refrigerator Co., Fremont, Nebr.
- Curtis Refrigerating Machine Co., St. Louis, Mo.
- De La Vergne Engine Co., Philadelphia, Pa.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrol Incorporated, Clifton, N. J.
- Fairbanks, Morse & Co., Chicago, Ill.
- Fedders Mfg. Co., Buffalo, N. Y.
- Frick Co., Waynesboro, Pa.
- General Air Conditioning Corp., Cincinnati, O.
- General Refrigeration Corp., Beloit, Wis.
- Giant Mfg. Co., Council Bluffs, Ia.
- Gilbert & Barker Mfg. Co., Springfield, Mass.
- Harvey-Whipple, Inc., Springfield, Mass.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Indian Trailer Corp., Koolroom Div., Chicago.
- Industrial Air Conditioning Co., Inc., Minneapolis. (Ice)
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Johnson Motors, Galesburg, Ill.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Kool-Klean Company, Newton, Iowa.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- Mayflower-Lewis Corp., St. Paul, Minn.
- McQuay, Inc., Minneapolis, Minn.
- Philco Radio & Television Corp., Philadelphia.
- Pioneer Air Conditioning Corp., Minneapolis, Minn.
- Refrigeration Economics Co., Inc., Canton, Ohio.
- Rempe Coil Co., Chicago, Ill.
- Standard Air Conditioning, Inc., New York City.

● Advertisement in this issue. See Index to Advertisers, page 168.

Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.

- Trane Co., La Crosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Von Seebeck, G., New York City.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Willard Metallic Crypt Co., Air Conditioning Div., Willard, O.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- York Ice Machinery Corp., York, Pa.
- Young Radiator Co., Racine, Wis.

### AIR CONDITIONING UNITS, ROOM TYPE, WINTER (Floor or suspended for heating, humidifying, circulating and cleaning)

- Airgard Manufacturing Co., Chicago, Ill.
- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Air Conditioning Co., Minneapolis, Minn.
- American Blower Corp., Detroit, Mich.
- Apex Rotarex Corp., Cleveland, O.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Buffalo Forge Co., Buffalo, N. Y.
- Burnham Boiler Corp., Irvington, N. Y.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Corozone Air Conditioning Corp., Cleveland, O.
- Crane Co., Chicago.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Des Moines Steel Furnace Co., Des Moines, Iowa.
- Dunham Co., C. A., Chicago, Ill.
- Economy Electric Mfg. Co., Cicero, Ill.
- Fairbanks, Morse & Co., Chicago, Ill.
- Fedders Mfg. Co., Buffalo, N. Y.
- General Electric Co., Schenectady, N. Y.
- Grinnell Co., Inc., Providence, R. I.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Mayflower-Lewis Corp., St. Paul, Minn.
- McQuay, Inc., Minneapolis, Minn.
- Nelson Corp., Herman, Moline, Ill. (Floor)
- Niagara Blower Co., New York City.
- Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Pioneer Air Conditioning Corp., Minneapolis, Minn.
- Refrigeration Economics Co., Inc., Canton, Ohio.
- Rampe Co., Chicago.
- Resnor Mfg. Co., Mercer, Pa.
- Somers, Inc., H. J., Detroit, Mich.
- Standard Air Conditioning, Inc., New York City.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Summerheat Co., South Bend, Ind. (Cabinet)
- Syncromatic Air Conditioning Corp., Milwaukee, Wis.
- U. S. Air Conditioning Corp., Minneapolis.
- Thermal Units Mfg. Co., Meriden, Conn.
- Trane Co., La Crosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Unified Air Conditioner Co., Duluth, Minn.
- Vigor-Aire Corp., Philadelphia, Pa.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- York Ice Machinery Corp., York, Pa.
- Young Radiator Co., Racine, Wis.

### AIR CONDITIONING UNITS, ROOM TYPE, YEAR AROUND

(Floor or suspended for heating, cooling, humidifying, dehumidifying, circulating and cleaning)

- Airgard Manufacturing Co., Chicago, Ill.
- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Blower Corp., Detroit, Mich.
- Apex Rotarex Corp., Cleveland, O.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Buffalo Forge Co., Buffalo, N. Y.
- Builders Iron Foundry, Providence, R. I.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Corozone Air Conditioning Corp., Cleveland, O.
- Curtis Refrigerating Machine Co., St. Louis.
- De La Vergne Engine Co., Philadelphia, Pa.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Fairbanks, Morse & Co., Chicago, Ill.
- Fedders Mfg. Co., Buffalo, N. Y.
- General Electric Co., Schenectady, N. Y.
- General Refrigeration Corp., Beloit, Wis.
- Grinnell Co., Inc., Providence, R. I.

- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Kalseraire Products Sales Co., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- Mayflower-Lewis Corp., St. Paul, Minn.
- McQuay, Inc., Minneapolis, Minn.
- Nash Refrigeration Co., Inc., Newark, N. J.
- Nelson Corp., Herman, Moline, Ill.
- Niagara Blower Co., New York City.
- Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
- Norwin Co., Freeport, Ill.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Peerless of America, Inc., Chicago, Ill.
- Pioneer Air Conditioning Corp., Minneapolis, Minn.
- Refrigeration Economics Co., Inc., Canton, Ohio.
- Standard Air Conditioning, Inc., New York City.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Syncromatic Air Conditioning Corp., Milwaukee, Wis.
- Thermal Units Mfg. Co., Meriden, Conn.
- Trane Co., La Crosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Unified Air Conditioner Co., Duluth, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- XL Refrigerating Co., Inc., Chicago, Ill.
- York Ice Machinery Corp., York, Pa.
- Young Radiator Co., Racine, Wis.

### AIR CONDITIONING UNITS, SUMMER COOLING, EVAPORATIVE TYPE

- Airtherm Mfg. Co., St. Louis.
- Ames Co., W. R., San Francisco, Cal.
- Atlas Heating & Ventilating Co., Ltd., San Francisco.
- Economy Electric Mfg. Co., Cicero, Ill.
- General Blower Co., Philadelphia.
- Kauffman Air Conditioning Corp., St. Louis.
- Moncrief Furnace & Manufacturing Co., Inc., Dallas, Texas.
- Mountain States Equipment Co., Denver, Colo.
- Norwin Co., Freeport, Ill.
- Pioneer Air Conditioning Corp., Minneapolis, Minn.
- Pernot & Rich, Inc., Los Angeles.
- Star Radiator Co., Los Angeles, Cal.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Fan Corporation, Los Angeles.
- Viking Air Conditioning Corporation, Cleveland.
- Western Engineering & Mfg. Co., Los Angeles.

### AIR DIFFUSERS

*See Diffusers, Air*

### AIR FILTERS

*See Filters, Air*

### AIR METERS

*See Meters, Air Velocity, Direct Reading*

### AIR WASHERS

*See Washers, Air*

### ANALYZERS, FLUE GAS

- Bacharach Industrial Instrument Co., Pittsburgh, Pa.
- Barclay, Inc., Robert, Chicago.
- Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia.
- Dwyer Mfg. Co., F. W., Chicago.
- Ellison Draft Gage Co., Chicago, Ill.
- Julien P. Friez & Sons, Baltimore.
- Hays Corp., Michigan City, Ind.
- Leeds & Northrup Co., Philadelphia, Pa.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Preferred Utilities Corp., New York City.
- Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.

### ANEMOMETERS

- Friez & Sons, Julien P., Baltimore, Md.
- H-B Instrument Co., Inc., Philadelphia.
- Hill Co., E. Vernon, Chicago, Ill.
- Illinois Testing Laboratories, Inc., Chicago, Ill.
- Precision Thermometer & Instrument Co., Philadelphia, Pa.
- Taylor Instrument Companies, Rochester, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 168.



## ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

- Aluminum Company of America, Pittsburgh, Pa.
- American Brass Co., Waterbury, Conn.
- Bethlehem Steel Co., Bethlehem, Pa.
- Byers Co., A. M., Pittsburgh, Pa.
- Brasco Mfg. Co., Harvey, Ill.
- Butler Street Foundry & Iron Co., Chicago, Ill.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Colonial Alloys Co., Philadelphia.
- Columbia Steel Co., San Francisco, Cal.
- Decatur Iron & Steel Co., Decatur, Ala.
- Gulf States Steel Co., Birmingham, Ala.
- Inland Steel Co., Chicago, Ill.
- International Steel Co., Evansville, Ind.
- Jones & Laughlin Steel Corp., Pittsburgh, Pa.
- Laclede Steel Co., St. Louis, Mo.
- Lukens Steel Co., Coatesville, Pa.
- Marion Machine, Foundry & Supply Co., Marion, Ind.
- Milcor Steel Co., Milwaukee, Wis.
- Republic Steel Corp., Cleveland, O.
- Revere Copper and Brass Incorporated, New York City.
- Steel and Tubes, Inc., Cleveland, O.
- Stran-Steel Division, Great Lakes Steel Corp., Detroit, Mich.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Truscon Steel Co., Youngstown, O.
- United States Steel Corp., Pittsburgh, Pa.
- Weirton Steel Co., Weirton, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

## ARC WELDERS

*See Welders, Arc*

## ASBESTOS PAPER

*See Paper, Asbestos*

## ATTIC FANS

*See Fans, Night Air Cooling*

## AUTOMATIC HUMIDIFIERS

*See Humidifiers, Furnace, Evaporation, Spray*

## BAND SAWS

*See Saws, Band, Sheet Metal Cutting*

## BARs

*See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)*

## BASES AND PADS, VIBRATION, ISOLATING

- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Armstrong Cork Co., Lancaster, Pa. (Cork)
- Buffalo Forge Co., Buffalo, N. Y.
- Butterworth, B. T., Jr., New Canaan, Conn.
- Carey Co., Philip, Cincinnati, Ohio.
- Cork Import Corp., New York City (Cork)
- Cork Insulation Co., Inc., New York, N. Y.
- Crown Cork & Seal Co., 4401 Eastern Ave., Baltimore.
- Fabling Co., W. D., Los Angeles, Cal.
- Felt Products Mfg. Co., Chicago, Ill.
- Felters Co., Inc., Boston.
- Firestone Tire & Rubber Co., Akron, O.
- General Electric Co., Schenectady, N. Y.
- Goodrich Co., B. F., Akron, O. (Rubber)
- Keldur Corporation, New York City.
- Korfund Co., Inc., Long Island City, N. Y.
- Lehigh Fan & Blower Co., Allentown, Pa.
- Lord Mfg. Co., Erie, Pa.
- Lukens Steel Co., Coatesville, Pa.
- Manley Products Corp., York, Pa.
- Mundet Cork Corp., New York City.
- Rockwood Mfg. Co., Indianapolis, Ind. (Pivoted motor)
- Sturtevant Co., B. F., Boston, Mass.
- Union Fibre Co., Inc., Winona, Minn.
- United Cork Companies, Kearny, N. J.
- United States Gypsum Co., Chicago, Ill.
- Vibration Eliminator Co., Long Island City, N. Y. (Cork)

## BEAMS

*See Angles, Bars, Beams, Channels and Tees (Light weight Shapes)*

## BEARINGS, BALL

- Ahlberg Bearing Co., Chicago.
- Dodge Mfg. Corp., Mishawaka, Ind.

- Fafnir Bearing Co., New Britain, Conn.
- Johnson Bronze Co., New Castle, Pa.
- New Departure Div. General Motors Corp., Bristol, Conn. (only)
- Norma-Hoffman Bearings Corp., Stamford, Conn.
- S K F Industries, Inc., Philadelphia.

## BEARINGS, PILLOW BLOCK

- Ahlberg Bearings Co., Chicago.
- Air Controls, Inc., Cleveland.
- Chicago Die Casting Co., Chicago.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Fafnir Bearing Co., New Britain, Conn.
- Freed Products Co., Moline, Ill.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Lau Blower Co., Dayton, Ohio.
- Link-Belt Co., Chicago.
- Randall Graphite Products Corp., Chicago.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- S K F Industries, Inc., Philadelphia.
- Norma-Hoffman Bearings Corp., Stamford, Conn.
- Royersford Foundry & Machine Co., Royersford, Pa.
- S K F Industries, Inc., Philadelphia.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Viking Air Conditioning Corp., Cleveland.

## BEARINGS, ROLLER

- Ahlberg Bearing Co., Chicago.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Fafnir Bearing Co., New Britain, Conn.
- Norma-Hoffmann Bearings Corp., Stamford, Conn.
- Royersford Foundry & Machine Co., Royersford, Pa.
- S K F Industries, Inc., Philadelphia.

## BEARINGS, SLEEVE

- Dodge Mfg. Corp., Mishawaka, Ind.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Johnson Bronze Co., New Castle, Pa.
- Medart Co., St. Louis.
- Randall Graphite Products Co., Chicago, Ill.

## BELTS, V-TYPE

- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Continental Rubber Works, Erie, Pa.
- Dayton Rubber Mfg. Co., Dayton, O.
- Dick Co., Inc., R. & J., Passaic, N. J.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Gates Rubber Co., Denver, Colo.
- Gilmer Co., L. H., Philadelphia, Pa.
- Goodrich Co., B. F., Akron, O.
- Goodyear Tire & Rubber Co., Akron, O.
- Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.
- Medart Co., St. Louis.
- Pyott Foundry & Machine Co., Chicago, Ill.
- Rockwood Mfg. Co., Indianapolis, Ind.
- Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
- Wood's Sons Co., T. B., Chambersburg, Pa.
- Worthington Pump & Machinery Corp., Harrisburg, N. J.

## BI-METALS, THERMOSTATIC

- Callite Product Co., Union City, N. J.
- Chace Co., W. M., Detroit, Mich.
- Clifford Mfg. Co., Boston, Mass. (Bellows)
- General Plate Co., Attleboro, Mass.
- Wilson Co., H. A., Newark, N. J.

## BLADES, FAN

- Advance Aluminum Castings Corp., Chicago, Ill.
- Aerovent Fan Co., Piqua, Ohio.
- Air Conditioning Products Co., Detroit, Mich.
- Aire-Foile Fan & Blower Co., Detroit, Mich.
- Airmaster Corp., Chicago, Ill.
- Allen Corp., Detroit.
- Autovent Fan & Blower Co., Chicago, Ill.
- Belanger Fan & Oven Co., Detroit.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., New York City.
- Clarage Fan Co., Kalamazoo, Mich.
- DeBothezat Vent. Eq. Div., American Machine & Metals, Inc., New York City.

● Advertisement in this issue. See Index to Advertisers, page 168.

Economy Electric Manufacturing Co., Cicero, Ill.  
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.

- Janette Mfg. Co., Chicago, Ill.
- Lau Blower Co., Dayton, O.
- Leinweber Fan & Blower Co., Chicago.
- Lohman, Inc., William J., New York City. (Propeller)
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Meier Electric & Machine Co., Indianapolis, Ind.
- Myers Electric Co., Pittsburgh, Pa.
- Peerless Electric Co., Warren, O.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Steel and Tubes, Inc., Cleveland O. (Stamping)
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Swift Mfg. Co., Detroit, Mich.
- Torrington Mfg. Co., Torrington, Conn.
- Victor Electric Products, Inc., Cincinnati, O.
- Wagner Electric Corporation, St. Louis.

## BLAST GATES

- Airtherm Mfg. Co., St. Louis, Mo.
- Berger Bros. Co., Philadelphia, Pa.
- Blower Application Co., Milwaukee, Wis.
- Buffalo Forge Co., Buffalo, N. Y.
- Champion Blower & Forge Co., Lancaster, Pa.
- Clarage Fan Co., Kalamazoo, Mich.
- Garden City Fan Co., Chicago, Ill.
- Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
- Goethel Co., Alfred C., Milwaukee, Wis.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Maysteel Products, Inc., Horicon St., Mayville, Wis.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- R-S Products Corp., Philadelphia, Pa.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Western Blower Co., Seattle, Wash.

## BLINDS, VENETIAN

- Athey Co., Chicago, Ill.
- Bostwick-Goodell Co., Norwalk, O.
- Chain Tape Venetian Blind Co., Rockford, Ill.
- Chicago Venetian Blind Co., Chicago, Ill.
- Columbia Mills, Inc., Saginaw, Mich.
- Higgin Mfg. Co., Newport, Ky.
- Hough Co., Janesville, Wis.
- Kane Mfg. Corporation, Kane, Pa.
- Miller & Connell Co., Chicago, Ill.
- Mitchell Moulding Co., Forest Park, Ill.
- Patterson Shade Co., Indianapolis, Ind.
- Schatz Venetian Blinds, Los Angeles, Cal.
- Swedish Venetian Blind Co., New York, N. Y.
- Warren Shade Co., Inc., Minneapolis, Minn.
- Western Venetian Blind Co., New York, N. Y.
- Yardley Screen & Weather Strip Corp., Columbus, O.

## BLOWER—FILTER UNITS, CENTRAL SYSTEM

- Agricola Furnace Co., Inc., Gadsden, Ala.
- Air Conditioning Equipment Co., Minneapolis, Minn.
- Air Controls, Inc., Cleveland, O.
- Aladdin Heating Corp., Oakland, Cal.
- American Blower Corp., Detroit.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- Ames Co., W. R., San Francisco, Cal.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Auburn Burner Co., Auburn, Ind.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Bard Mfg. Co., Bryan, O.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Brundage Co., Kalamazoo, Mich.
- Bryant Corp., C. L., Cleveland.
- Buffalo Forge Co., Buffalo, N. Y.
- Calesco Corporation, Lynn, Mass.
- Campbell Heating Co., Des Moines, Ia.
- Champion Blower & Forge Co., Lancaster, Pa.
- Dall Steel Products Co., Lansing, Mich.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Economy Baler Co., Ann Arbor, Mich.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Evans Corp., George, Moline, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Furblo Co., Hermansville, Mich.
- Gehri Co., Tacoma, Wash.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis.

- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harvey-Whipple, Inc., Springfield, Mass.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Home Comfort Co., Harvey, Ill.
- Jaden Mfg. Co., Inc., F. Hastings, Nebr.
- Kals Sunrise Works, Detroit, Mich.
- Kelsey Heating Co., Syracuse, N. Y.
- Kruse Co., Inc., Indianapolis, Ind.
- Lau Blower Co., Dayton, O.
- Lennox Furnace Co., Marshalltown, Ia.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- Mayflower-Lewis Corp., St. Paul, Minn.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fleberger Co., Newark, Ohio.
- McPherson Furnace & Supply Co., Portland, Ore.
- Mellish & Murray Co., Chicago, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Nelson Corp., Herman, Moline, Ill.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Peerless Electric Co., Warren, O.
- Peerless Foundry Co., Indianapolis, Ind.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Premier Furnace Co., Dowagiac, Mich.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Round Oak Co., Dowagiac, Mich.
- Royal Air Conditioning Equipment, Compton, Cal.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- Surface Combustion Corp., Toledo, Ohio.
- Swift Corp., Carl E., Holland, Mich.
- Thatcher Furnace Co., Newark, N. J.
- Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- United States Radiator Corp., Detroit.
- Viking Air Conditioning Corp., Cleveland, O.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Western Blower Co., Seattle, Wash.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Wise Furnace Co., Akron, O.

## BLOWER—HUMIDIFIER UNITS, CENTRAL SYSTEM

- Atlas Heating & Ventilating Co., Ltd., San Francisco.
- Brundage Co., Kalamazoo, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, Ohio.
- Fox Furnace Division of American Radiator Co., Elyria, Ohio.
- Jaden Mfg. Co., Inc., F. Hastings, Nebr.
- Nelson Corp., Herman, Moline, Ill.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Somers, Inc., H. J., Detroit.

## BLOWER—WASHER UNITS, CENTRAL SYSTEM

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Machine Products Co., Marshalltown, Ia.
- Ames Co., W. R., San Francisco, Cal.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Bard Mfg. Co., Bryan, O.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Blower Application Company, Milwaukee.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo, N. Y.
- Campbell Heating Co., Des Moines, Ia.
- Champion Blower & Forge Co., Lancaster, Pa.
- Dall Steel Products Co., Lansing, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Economy Baler Co., Ann Arbor, Mich.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Furblo Co., Hermansville, Mich.
- Gehri Co., Tacoma, Wash.
- King Ventilating Co., Owatonna, Minn.
- Lau Blower Co., Dayton, O.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Mellish & Murray Co., Chicago, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Somers, Inc., H. J., Detroit.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Supreme Heater & Ventilating Corp., St. Louis, Mo.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utica Radiator Corporation, Utica, N. Y.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Wise Furnace Co., Akron, O.

### BLOWERS, FORCED DRAFT, FOR ASH PIT

- American Blower Corp., Detroit.
- Bignall Co., Medina, N. Y.
- Blower Application Company, Milwaukee.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo, N. Y.
- Burnwell Corp., Allentown, Pa.
- Champion Blower & Forge Co., Lancaster, Pa.
- Economy Electric Mfg. Co., Cicero, Ill.
- Garden City Fan Co., Chicago.
- Henry Furnace & Fdy. Co., Cleveland.
- South Bend Air Products, Inc., South Bend, Ind.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.

### BLOWERS, FORCED DRAFT, FOR SMOKE PIPE

- Blower Application Company, Milwaukee.
- Brundage Co., Kalamazoo, Mich.
- Economy Electric Mfg. Co., Cicero, Ill.
- Garden City Fan Co., Chicago.
- Muncie Gear Works, Muncie, Ind.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.

### BLOWERS, FURNACE, CENTRIFUGAL

- Agricola Furnace Co., Inc., Gadsden, Ala.
- Air Conditioning Equipment Co., Minneapolis, Minn.
- Air Controls, Inc., Cleveland, O.
- American Blower Corp., Detroit, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Machine Products Co., Marshalltown, Ia.
- Ames Co., W. R., San Francisco, Cal.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Autovent Fan & Blower Co., Chicago, Ill.
- Bard Mfg. Co., Bryan, Ohio.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo, N. Y.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Campbell Heating Co., Des Moines, Ia.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chandler Co., Cedar Rapids, Ia.
- Chicago Steel Furnace Co., Chicago, Ill.
- Clarage Fan Co., Kalamazoo, Mich.
- Dall Steel Products Co., Lansing, Mich.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Economy Baler Co., Ann Arbor, Mich.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Furblo Co., Hermansville, Mich.
- Garden City Fan Co., Chicago, Ill.
- Gehri Co., Tacoma, Wash.
- General Blower Co., Philadelphia, Pa.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Hess Warming & Ventilating Co., Chicago, Ill.
- "Home Comfort" Furnace Co., St. Louis, Mo.
- Ideal Furnace Co., Detroit, Mich.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Lau Blower Co., Dayton, O.
- Lennox Furnace Co., Marshalltown, Iowa.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- Marshall Furnace Co., Marshall, Mich.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mountain States Equipment Co., Denver, Colo.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Nelson Corp., Herman, Moline, Ill.
- New York Blower Co., Chicago, Ill.
- Niagara Blower Co., New York City.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Peerless Electric Co., Warren, O.
- Premier Furnace Co., Dowagiac, Mich.
- Roots-Connersville Blower Corp., Connersville, Ind.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Mfg. Co., St. Louis.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- Star Radiator Co., Los Angeles.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utility Fan Corporation, Los Angeles, Cal.
- Viking Air Conditioning Corp., Cleveland, O.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Western Blower Co., Seattle, Wash.
- Wolverine Blower Works, Grand Rapids, Mich.

### BLOWERS, VENTILATING SYSTEM

(Capacity 4,000 c.f.m. up)

- Advance Fan & Blower Co., Detroit, Mich.
- Air Controls, Inc., Cleveland, O.
- American Blower Corp., Detroit, Mich.
- American Coolair Corp., Jacksonville, Fla.
- American Foundry & Furnace Co., Bloomington, Ill.
- Ames Co., W. R., San Francisco, Cal.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Arex Co., Chicago, Ill.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Autovent Fan & Blower Co., Chicago, Ill.
- Barrett Engineers, Cleveland Heights, O.
- Bayley Blower Co., Milwaukee, Wis.
- Berns Specialty Co., Chicago, Ill.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo, N. Y.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Champion Blower & Forge Co., Lancaster, Pa.
- Clarage Fan Co., Kalamazoo, Mich.
- Coppus Engineering Corp., Worcester, Mass.
- De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.
- Des Moines Steel Furnace Co., Des Moines, Iowa.
- Economy Electric Manufacturing Co., Cicero, Ill.
- Evry-Use Products, Inc., New York City.
- Furblo Co., Hermansville, Mich.
- Garden City Fan Co., Chicago, Ill.
- General Blower Co., Philadelphia, Pa.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Hartzell Propeller Fan Co., Piqua, O.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Johnson Fan & Blower Corp., Chicago, Ill.
- Lau Blower Co., Dayton, O.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Mechanical Air, Little Rock, Ark.
- Mountain States Equipment Co., Denver, Colo.
- Northern Blower Co., Cleveland, Ohio.
- New York Blower Co., Chicago, Ill.
- Niagara Blower Co., New York City.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Peterson Freezem Mfg. & Sales Co., Kansas City, Mo.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Reynolds Manufacturing Co., Grand Rapids, Mich.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Round Oak Co., Dowagiac, Mich.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Smith Heater Co., Peter, Detroit, Mich.
- Somers, Inc., H. J., Detroit.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- Star Electric Motor Co., Bloomfield, N. J.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Supreme Heater & Ventilating Corp., St. Louis, Mo.
- Todd Air Conditioning Co., Inc., Bonner Springs, Kans.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utility Fan Corporation, Los Angeles, Cal.
- Victor Electric Products, Inc., Cincinnati, O.
- Western Blower Co., Seattle, Wash.
- Wing Mfg. Co., L. J., New York City.
- Wolverine Blower Works, Grand Rapids, Mich.

### BLOW PIPE EQUIPMENT

See Blast Gates; Collectors, Blow Pipe; Fittings, Blow Pipe

### BOOTS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

### BRAKES, METAL WORKERS', HAND

- Bertsch & Co., Cambridge City, Ind.
- Dreis & Krump Mfg. Co., Chicago, Ill.
- Elker Mfg. Co., The, Ogallala, Nebr.
- Glascok Bros. Mfg. Co., Muncie, Ind.
- Niagara Machine & Tool Works, Buffalo, N. Y.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Steelweld Machinery Co., Cleveland, O.
- Whitney Metal Tool Co., Rockford, Ill.
- Weiss & Co., H., New York City.

• Advertisement in this issue. See Index to Advertisers, page 168.



## BRAKES, METAL WORKERS', PORTABLE

- Dreis & Krump Mfg. Co., Chicago.
- Elker Mfg. Co., Ogallala, Nebr.
- Whitney Metal Tool Co., Rockford, Ill.

## BRAKES, METAL WORKERS', POWER

- Bertsch & Co., Cambridge City, Ind.
- Cincinnati Shaper Co., Cincinnati, O.
- Dreis & Krump Mfg. Co., Chicago, Ill.
- Excelsior Tool and Machine Co., East St. Louis, Ill.
- Heartley Machine & Tool Co., Toledo, O.
- New Albany Machine Mfg. Co., New Albany, Ind.
- Niagara Machine & Tool Works, Buffalo, N. Y.
- Ohl & Co., Geo. A., Newark, N. J.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rafter Machine Co., Belleville, N. J.
- Verson Allsteel Press Co., Chicago.
- Weiss & Co., H., New York City.
- Whitney Metal Tool Co., Rockford, Ill.

## BRUSHES, ACID

- Cleveland Brush Factory, Inc., Cleveland, O.
- Lukens Metal Co., Thos. F., Philadelphia, Pa.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milwaukee Brush Mfg. Co., Milwaukee, Wis.
- Osborn Mfg. Co., Cleveland, O.
- Potomac Mfg. Co., Philadelphia, Pa.
- Schaefer Brush Mfg. Co., Milwaukee, Wis. (Rustproof)
- Weiss & Co., H., New York City.

## BRUSHES, FURNACE

- Cleveland Brush Factory, Inc., Cleveland, O.
- Mill-Rose Co., Cleveland, O.
- Milwaukee Brush Mfg. Co., Milwaukee, Wis.
- Osborn Mfg. Co., Cleveland, O.
- Pilley Packing & Flue Brush Mfg. Co., St. Louis, Mo.
- Schaefer Brush Mfg. Co., Milwaukee, Wis.
- Swift Corp., Carl E., Holland, Mich.
- Worcester Brush & Scraper Co., Worcester, Mass.

## BUFFERS, GRINDERS, POLISHERS AND SANDERS, ELECTRIC

- Black & Decker Mfg. Co., Towson, Md.
- Diehl Mfg. Co., Elizabethport, N. J.
- Independent Pneumatic Tool Co., Chicago, Ill.
- Mall Tool Co., Chicago, Ill.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Misener Mfg. Co., Inc., Syracuse, N. Y.
- Skilsaw, Inc., Chicago, Ill.
- Speedway Mfg. Co., Cicero, Ill.
- Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
- Wodack Electric Tool Corp., Chicago, Ill.

## BURNERS, GAS, CONVERSION, RESIDENTIAL

- American Gas Products Div. of American Radiator Co., New York City.
- Auburn Burner Co., Auburn, Ind.
- Autogas Corp., Chicago.
- Barber Gas Burner Co., Cleveland, O.
- Beck Engineering Combustion Kompany, St. Louis, Mo.
- Bryan Steam Corp., Peru, Ind.
- Bryant Corp., C. L., Cleveland, O.
- Bryant Heater Co., Cleveland, O.
- Burdett Mfg. Co., Chicago, Ill.
- Columbia Burner Co., Toledo, O.
- Continental Stove Corp., Ironton, O.
- Franklin Gas Heating Co., Cincinnati, Ohio.
- Hudson-Root Company, Brocton, N. Y.
- Johnson Gas Appliance Co., Cedar Rapids, Iowa.
- Leahy Mfg. Co., Los Angeles, Cal.
- Martin, J. O. & C. U., San Francisco.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Monerief Furnace & Mfg. Co., Inc., Dallas, Tex.
- National Machine Works, Chicago, Ill.
- R-S Products Corp., Philadelphia, Pa.
- Roberts-Gordon Appliance Corp., Buffalo, N. Y.
- Rotary Mfg. Co., Los Angeles, Cal.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Sioux City Foundry and Boiler Co., Sioux City, Iowa.
- Sonner Burner Co., Winfield, Kans.
- Spencer Heater Division, Williamsport, Pa.
- Standard Heating & Radiator Co., Pittsburgh, Pa.
- Surface Combustion Corp., Toledo, O.
- Vacuum Gas Burner Corp., Olean, N. Y.

## BURNERS, OIL, CONVERSION, RESIDENTIAL

- Ace Engineering Co., Chicago, Ill. (Rotary)
- Acme Oil Burner Company, Inc., Cedar Rapids, Ia. (Gun)
- Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y.
- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- Aldrich Co., Peoria, Ill.
- American Oil Burners & Heating Utilities, Brooklyn, N. Y.
- American Radiator Co., New York City. (Gun)
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Auburn Burner Co., Auburn, Ind. (Gun and rotary)
- Autocrat Oil Burner Corp., Cedar Rapids, Ia.
- Auto-Heat Corp., New York City. (Gun)
- Automatic Burner Corp., Chicago, Ill. (Gun and rotary)
- Badger Mfg. Co., Madison, Wis. (Gun)
- Ballard, Inc., Arthur H., Boston, Mass.
- Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
- Beckett Engineering Co., R. W., Elyria, Ohio.
- Bennett Co., Omaha, Nebr. (Gun)
- Berryman Oil Burner Co., Chicago, Ill. (Gun, Gravity and Rotary)
- Bethlehem Foundry & Machine Co., Bethlehem, Pa. (Gun)
- Bradley Engineering, Inc., Providence, R. I. (Pressure gun)
- Brigham Oil Burner Co., St. Louis, Mo. (Gun and gravity)
- Brown Oil Burning Equipment Co., Cambridge, Mass. (Gun and rotary)
- Bryan Steam Corp., Peru, Ind. (Rotary and gun)
- Calesco Corporation, Lynn, Mass. (Gun and gravity)
- Caloroll Burner Corp., Hartford, Conn. (Atmospheric, gun, horizontal rotary, vacuum pressure, wall flame)
- Campbell Machine Co., Minneapolis
- Cary Mfg. Co., Waupaca, Wis. (Gravity)
- Carrier Corp., Syracuse, N. Y.
- Century Engineering Corp., Cedar Rapids, Ia. (Gun)
- Chalmers Oil Burner Co., Minneapolis, Minn. (Gun and rotary)
- Char-Gale Mfg. Co., Minneapolis, Minn.
- Chicago Steel Furnace Co., Chicago, Ill.
- Cleveland Steel Products Corp., Toridheet Div., Cleveland, O. (Gun and rotary)
- Columbus Metal Products, Inc., Columbus, Ohio.
- Crystal Refrigerator Co., Fremont, Nebr. (Gun)
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- D'Elia Oil Burner Co., Inc., Bridgeport, Conn. (Gun)
- Easternoil, Inc., Portland, Me. (Gun)
- Electrol, Incorporated, Clifton, N. J.
- Excello Oil Heating Corp., Omaha, Nebr.
- Excelsior Steel Furnace Co., Chicago.
- Fargo Foundry Co., Fargo, N. D. (Gun)
- Fairfield Oil Heating Co., Inc., Greenwich, Conn. (Gun)
- Fluid Heat Division, Anchor Post Fence Co., Baltimore.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gasoroll Furnace Co., Chicago, Ill.
- General Electric Co., Schenectady, N. Y.
- General Oil Heating Corp., West New York, N. J. (Gun)
- Gilbert & Barker Mfg. Co., Springfield, Mass. (Gun)
- Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y. (Gun)
- Green Foundry & Furnace Works, Des Moines, Ia. (Gun)
- Grinnell Washing Machine Corp., Grinnell, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hardinge Oil Burner Co., Chicago, Ill.
- Hart Oil Burner Corp., Peoria, Ill. (Gun)
- Harvey-Whipple, Inc., Springfield, Mass. (Gun)
- Hell Co., Milwaukee, Wis. (Gun)
- Hess Warming and Ventilating Co., Chicago, Ill.
- Hipoint Corp., Bellefontaine, O.
- Holtum Mfg. Co., Freeport, Ill. (Gun)
- Home Oil Burner Corp., Hempstead, N. Y. (Gun)
- Hotentot Co., Inc., Omaha, Nebr. (Gun and gravity)
- Hubbard Co., Minneapolis, Minn. (Gun)
- Hupp Oil Burner Co., Inc., Brooklyn, N. Y. (Gun)
- Ingle Mfg. Co., San Diego, Cal. (Gravity)
- Iowa Foundry Co., Sioux City, Ia.
- Jacobsen Mfg. Co., Racine, Wis. (Gun)
- Johnson Co., S. T., Oakland, Cal., and Philadelphia. (Gun)
- Johnson Mfg. Co., Waterloo, Ia. (Gun)
- Johnston Mfg. Co., Minneapolis, Minn. (Gun)
- Kais Sunrise Works, Detroit, Mich. (Gravity and rotary)
- Kaybar Burner Corp., Chicago, Ill.
- Keith Furnace Co., Des Moines, Ia. (Gun)
- Kelvinator Div., Nash-Kelvinator Corp., Detroit. (Gun)
- Kleen Heat, Inc., Chicago, Ill. (Gun)
- Korth Oil Burner Corp., Roselle Park, N. J. (Rotary and gun)
- Laco Oil Burner Co., Griswold, Ia.
- Landwehr Heating Corp., Philadelphia, Pa.
- Leahy Mfg. Co., Los Angeles, Cal.
- Leeson Co., T. F., Detroit, Mich. (Gun)
- Lennox Furnace Co., Marshalltown, Iowa.
- Little Burner Co., Inc., H. C., San Rafael, Cal. (Gravity)
- Littleford Bros., Cincinnati, O.
- Lynn Products Co., Lynn, Mass. (Gun)
- Mahan Oil Burner & Furnace Co., Elmhurst, Ill. (Gravity)
- Malleable Iron Fittings Co., Branford, Conn. (Gun)
- May Oil Burner Corp., Baltimore, Md. (Gun)
- Mayflower Oil Burner Corp., West New York, N. J. (Gun)
- Meyer Furnace Co., Peoria, Ill.
- Micro-Westco, Inc., Bettendorf, Iowa.
- Montag Stove & Furnace Works, Portland, Ore. (Gun)
- National Airoll Burner Co., Philadelphia, Pa. (Gun)

• Advertisement in this issue. See Index to Advertisers, page 168.

Nelson Corp., Herman, Moline, Ill. (Gun)  
Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Nu-Way Corp., Rock Island, Ill.  
Pan American Engineering Company, Berkeley, Cal. (Gun, rotary and turbine)

Paragon Oil Burner Corp., Brooklyn, N. Y.  
Par Appliances, Inc., LaCrosse, Wis. (Gravity Forced Draft)  
Peerless Oil Burner Co., Inc., Kansas City, Mo. (Gravity)  
Peoples Oil Burner Co., Chicago, Ill. (Gravity)  
Petroleum Heat & Power Co., Stamford, Conn. (Rotary and gun)

Pioneer Manufacturing Co., Cedar Rapids, Ia.  
Preferred Utilities Manufacturing Corp., New York City.  
Pressure Oil Burners, Inc., York, Pa. (Gun)  
Quaker Mfg. Co., Chicago.

Quiet Heat Burner Co., Brooklyn, N. Y.  
Quiet Heat Mfg. Co., Newark, N. J.  
R-S Products Corp., Philadelphia, Pa. (Gun)  
Ray Oil Burner Co., San Francisco, Cal. (Gun and rotary)  
Reif-Rexoil, Inc., Buffalo, N. Y.  
Rotary Mfg. Co., Los Angeles, Cal. (Rotary)

● Round Oak Co., Dowagiac, Mich.  
Rudy Furnace Co., Dowagiac, Mich.  
Scott-Newcomb, Inc., St. Louis, Mo. (Gun)  
Sentry Mfg. Co., Omaha, Nebr. (Gun)  
Shedlov Oil Burners, Inc., Minneapolis, Minn. (Gravity, gun)  
Silent Glow Oil Burner Corp., Hartford, Conn.  
Silent Sioux City Burner Corp., Orange City, Ia. (Gravity)  
Simplex Oil Heating Corp., New York City. (Gun, rotary and turbine)

Skinner Co., E. W., Fitchburg, Mass. (Gravity)  
Summerheat Co., South Bend, Ind. (Low pressure)  
Sundstrand Engineering Co., Rockford, Ill. (Gun)  
Sun-Ray Oil Burner Corp., Rockaway Park, N. Y. (Gun)  
Synoro-Flame Burner Corp., Willimantic, Conn. (Gun, rotary)  
Timken Silent Automatic Co., Detroit, Mich. (Gun and rotary)  
Todd Combustion Equipment, Inc., Brooklyn, N. Y.  
Uni-Fire Co., Detroit, Mich. (Rotary)  
United States Burner Corp., Hartford, Conn. (Gun and rotary)  
Valley Mfg. Co., Athol, Mass. (Gun and rotary)  
Victor Oil Burner Mfg. Co., Hartford, Conn. (Gravity)  
Viking Mfg. Co., Akron, Ohio.  
Volcano Burner Corp., New York City. (Gun)  
Vortex Mfg. Co., Portland, Ore.

● Waterman-Waterbury Co., Minneapolis. (Gun)  
Wayne Oil Burner Corp., Fort Wayne, Ind. (Gun)  
Westchester Home Equipment Co., Inc., Bronx, N. Y. (Gun)  
Westinghouse Electric & Mfg. Co., East Springfield, Mass.  
Westwick & Son, Inc., John, Galena, Ill. (Gun)  
Williams Oil-O-Matic Heating Corp., Bloomington, Ill. (Gun)  
Wood Industries, Inc., Gar, Detroit, Mich. (Gun)  
Woolery Machine Co., Minneapolis, Minn. (Gun)  
York Oil Burner Co., Inc., York, Pa. (Gun)

## CABINETS AND CASINGS

Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.  
Brundage Co., Kalamazoo, Mich.  
Char-Gale Mfg. Co., Minneapolis, Minn.  
Columbus Heating & Ventilating Co., Columbus, Ohio.  
Falstrom Co., Passaic, N. J.  
General Metal Products Co., St. Louis, Mo.  
Hauserman Co., E. F., Cleveland.  
Hotentot Co., Inc., Omaha, Nebr.  
● Lau Blower Co., Dayton, Ohio.  
Maysteel Products, Inc., Mayville, Wis.  
Mullins Mfg. Corp., Warren, Ohio.  
St. Charles Mfg. Co., St. Charles, Ill.

## CAPS AND TOPS, CHIMNEY

● Accurate Mfg. Works, Chicago, Ill.  
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.  
Adams Co., Dubuque, Ia.  
● Allen Corp., Detroit, Mich.  
Ames Co., W. R., San Francisco, Cal.  
● Chicago Metal Mfg. Co., Chicago, Ill.  
Decatur Iron & Steel Co., Decatur, Ala.  
Edwards Mfg. Co., Inc., Cincinnati, O.  
● Excelsior Steel Furnace Co., Chicago, Ill.  
Hirschman Co., Inc., W. F., Buffalo, N. Y.  
Industrial Sheet Metal Works, Inc., Detroit, Mich.  
Iwan Brothers, South Bend, Ind.  
Lamb & Ritchie Co., Cambridge, Mass.  
Little Burner Co., Inc., H. C., San Rafael, Cal.  
Martin Metal Mfg. Co., Wichita, Kan.  
● Meyer & Bro. Co., F., Peoria, Ill.  
● Milcor Steel Co., Milwaukee, Wis.  
Neemes Foundry, Inc., Troy, N. Y.  
● Osborn Co., J. M. & L. A., Cleveland.  
Providence Cornice Co., Providence, R. I.  
Rynlker Sheet Metal Works, Inc., Billings, Mont.  
Schoedinger Co., F. O., Columbus, O.  
Southbridge Roofing Co., Inc., Southbridge, Mass.  
Sterling Foundry Company, Sterling, Ill. (Cast iron)  
Tierney Rotor Ventilator Co., Minneapolis, Minn.  
Vall Mfg. Co., Fort Wayne, Ind.

## CASINGS

See Cabinets and Casings

## CEILINGS, METAL

Brooklyn Metal Ceiling Co., Brooklyn, N. Y.  
Canton Steel Ceiling Mfg. Co., Canton, O.  
Edwards Mfg. Co., Inc., Cincinnati, O.  
Friedley-Voshardt Co., Chicago, Ill.  
International Steel Co., Evansville, Ind.  
Klauser Mfg. Co., Dubuque, Ia.  
Martin-Parry Corp., York, Pa.  
Maysteel Products, Inc., Mayville, Wis.  
Mesker & Co., Geo. L., Evansville, Ind.  
● Milcor Steel Co., Milwaukee, Wis.  
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.  
Reeves Steel & Mfg. Co., Dover, O.  
St. Paul Corrugating Co., St. Paul, Minn.  
Schoedinger Co., F. O., Columbus, O.  
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
(Galvanized steel beaded)  
Wheeling Corrugating Co., Wheeling, W. Va.  
Woolwine Metal Products Co., Los Angeles, Cal.

## CEMENT, FURNACE

Acme Refining Co., Cleveland, O.  
● Armstrong Co., Detroit, Mich.  
Barber Co., Inc., Philadelphia, Pa.  
Buckeye Products Co., Cincinnati, O.  
Carey Co., Philip, Lockland, Cincinnati, O.  
Clinton Metallic Paint Co., Clinton, N. Y.  
Connors Paint Mfg. Co., Wm., Troy, N. Y.  
Continental Products Co., Euclid, O.  
Eagle-Picher Lead Co., Cincinnati, O. (Asbestos)  
Ehret Magnesia Mfg. Co., Valley Forge, Pa.  
Fireline Stove & Furnace Lining Co., Chicago, Ill.  
Hercules Chemical Co., Inc., New York City.  
Hetzel Roofing Products Co., Newark, N. J.  
Hilo Varnish Corporation, Brooklyn, N. Y.  
Iowa Paint Mfg. Co., Des Moines, Ia.  
Johns-Manville, New York City.  
Keasbey & Mattison Co., Ambler, Pa.  
Krehbiel, J. H., Chicago, Ill.  
Laclede-Christy Clay Products Co., St. Louis, Mo.  
Lastik Products Co., Inc., Pittsburgh, Pa.  
Pecora Paint Co., Philadelphia, Pa.  
Plastic Products Co., Detroit, Mich.  
Preferred Utilities Mfg. Corp., New York City.  
Presstite Engineering Co., St. Louis, Mo.  
● Pyrolite Products Co., Cleveland, O.  
Ramtite Co., Chicago, Ill.  
Refractory & Insulating Corp., New York City.  
Rex Clay Products Co., Detroit, Mich.  
● Ruberoid Co., New York City.  
Rutland Fire Clay Co., Rutland, Vt.  
Sauereisen Cements Co., Sharpsburg, Pa.  
Schundler & Co., Inc., F. E., Joliet, Ill.  
Standard Asbestos Mfg. Co., Chicago, Ill.  
Standard Fuel Engineering Co., Detroit, Mich.  
Tamms Silica Co., Chicago, Ill.  
● Walsh Refractories Corp., St. Louis, Mo.  
Wilhelm Co., A., Reading, Pa.  
Williamson Heater Co., Cincinnati, O.  
● Wilson, Inc., Grant, Chicago, Ill.

## CEMENT, INSULATING

Baldwin-Hill Co., Trenton, N. J. (Rockwool)  
Carey Co., Philip, Cincinnati, Ohio.  
Certain-teed Products Corp., New York City.  
Chicago Fire Brick Co., Chicago, Ill.  
Clinton Metallic Paint Co., Clinton, N. Y.  
Connors Paint Mfg. Co., Wm., Troy, N. Y.  
Eagle-Picher Lead Co., Cincinnati, O.  
Ehret Magnesia Mfg. Co., Valley Forge, Pa.  
Hercules Chemical Co., Inc., New York City.  
Johns-Manville, New York City. (Asbestos)  
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)  
Krehbiel, J. H., Chicago. (Asbestos, mineral wool)  
● Laclede-Christy Clay Products Co., St. Louis, Mo.  
Norristown Magnesia & Asbestos Co., Norristown, Pa.  
Ohmlac Paint & Refining Co., Chicago, Ill.  
Owens-Corning Fiberglas Corp., Toledo, Ohio.  
Preferred Utilities Mfg. Corp., New York City.  
● Pyrolite Products Co., Cleveland, O.  
Refractory & Insulation Corp., New York City.  
Rex Clay Products Company, Detroit.  
● Ruberoid Co., New York City.  
Rutland Fire Clay Co., Rutland, Vt.  
● Sall Mountain Co., Chicago, Ill.  
Sauereisen Cements Co., Sharpsburg St., Pittsburgh.  
Schundler & Co., Inc., F. E., Joliet, Ill.  
Smith & Kanzler, Inc., Elizabeth, N. J.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Standard Asbestos Mfg. Co., Chicago, Ill.
- Tamms Silica Co., Chicago, Ill.
- Thompson & Co., Pittsburgh, Pa.
- U. S. Mineral Wool Co., Chicago. (High temperature mineral wool cement)
- Wilhelm Co., A., Reading, Pa.
- Wilson, Inc., Grant, Chicago, Ill.

## CEMENT, ROOF

- Acme Refining Co., Cleveland, O. (Liquid and plastic)
- Acorn Refining Co., Cleveland.
- All States Roofers Equipment & Material Co., Chicago, Ill.
- Barber Co., Inc., Philadelphia, Pa.
- Barrett Co., New York City.
- Bird & Son, Inc., East Walpole, Mass.
- Calbar Paint & Varnish Co., Philadelphia, Pa.
- Carey Co., Philip, Cincinnati, O.
- Carter Paint Co., Liberty, Ind.
- Certain-teed Products Corp., New York City.
- Clinton Metallic Paint Co., Clinton, N. Y.
- Connors Paint Mfg. Co., Wm., Troy, N. Y.
- Continental Products Co., Euclid, O.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Flintkote Co., New York City.
- Glidden Co., Cleveland, O.
- Hetzel Roofing Products Co., Newark, N. J.
- Horn Co., A. C., Long Island City, N. Y.
- Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
- Johns-Manville, New York City.
- Krehbiel, J. H., Chicago.
- Lastik Products Co., Inc., Pittsburgh, Pa.
- Miller & Son, C. Arthur, Elmira, N. Y.
- National Mfg. Corp., Tonawanda, N. Y.
- Ohmlac Paint & Refining Co., Chicago, Ill.
- Pecora Paint Co., Philadelphia, Pa. (Asbestos)
- Presstite Engineering Co., St. Louis, Mo.
- Pyrolite Products Co., Cleveland, O.
- Ruberoid Co., New York City.
- Rutland Fire Clay Co., Rutland, Vt.
- Thompson & Co., Pittsburgh, Pa.
- Tropical Paint & Oil Co., Cleveland, O.
- United States Gypsum Co., Chicago, Ill.
- Wilhelm Co., A., Reading, Pa.

## CHAIN, FURNACE

- American Chain Co., Inc., Bridgeport, Conn.
- Bead Chain Mfg. Co., Bridgeport, Conn.
- Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
- Chain Products Co., Cleveland, O.
- Corbin Screw Corp., New Britain, Conn.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- McKay Co., Pittsburgh.
- Russell Mfg. Co., John M., Naugatuck, Conn.
- Turner & Seymour Mfg. Co., Torrington, Conn.

## CHANNELS

*See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)*

## CLEANERS, VACUUM, FURNACE

- American Radiator Co., New York City.
- Arco Vacuum Corp., New York City.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Barrett Mfg. Co., Kansas City, Mo.
- Breuer Electric Mfg. Co., Chicago, Ill.
- Brillion Furnace Co., Brillion, Wis.
- Christie Cleaner Co., Cincinnati, O.
- Densmore-Quinlan Co., Kenosha, Wis.
- Dickson & Eddy, New York City.
- Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
- Electric Vacuum Cleaner Co., Inc., Cleveland, O.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Kent Co., Inc., Rome, N. Y.
- National Super Service Co., Toledo, O.
- Root-Connersville Blower Corp., Connersville, Ind.
- Spencer Turbine Co., Hartford, Conn.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Swift Corp., Carl E., Holland, Mich.

## CLIPS, FASTENING, FOR ROOFING

- American Sheet Metal Works, New Orleans, La.
- Berger Brothers Co., Philadelphia, Pa.
- Bird & Son, Inc., East Walpole, Mass.
- Bridgesburg Foundry Co., Philadelphia, Pa.
- Edwards Mfg. Co., Inc., Cincinnati, O.

- Milcor Steel Co., Milwaukee, Wis.
- National Stainless Clip Corp., New York City. (Stainless)
- Osborn Co., J. M. & L. A., Cleveland, O.
- Pfeifer, Wm., New York City.
- Southbridge Roofing Co., Inc., Southbridge, Mass.

## CLIPS AND TIPS, DAMPER

- Adams Co., Dubuque, Ia.
- Berger Bros. Co., Philadelphia, Pa.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Griswold Mfg. Co., Erie, Pa.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- Howes Co., S. M., Charlestown, Boston, Mass.
- K-B-Damper Control, Cincinnati, O.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Stover Mfg. & Engine Co., Freeport, Ill.
- United States Register Co., Battle Creek, Mich.
- Young Regulator Co., Cleveland, O.

## COAL BURNERS, AUTOMATIC

*See Stokers*

## COATINGS, PROTECTIVE, METAL

- Metalizing Co., Los Angeles, Cal.
- White & Co., Haydn F., Cleveland, O.

## COILS, COOLING, DIRECT EXPANSION

- Advanced Refrigerating Systems Co., Philadelphia, Pa.
- Aerofin Corp., Syracuse, N. Y.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Beacon-Morris Corp., Boston, Mass.
- Bohn Aluminum & Brass, Detroit.
- Bush Mfg. Co., Hartford, Conn.
- Clarage Fan Co., Kalamazoo, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Fedders Mfg. Co., Buffalo, N. Y.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Frick Co., Waynesboro, Pa.
- G & O Mfg. Co., New Haven, Conn.
- General Refrigeration Corporation, Beloit, Wis.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- McCord Radiator & Mfg. Co., Detroit, Mich.
- McQuay, Inc., Minneapolis, Minn.
- Marlo Coil Co., St. Louis, Mo.
- Modine Mfg. Co., Racine, Wis.
- Nash Refrigeration Co., Inc., Newark, N. J.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Reliance Refrigeration Machine Co., Chicago, Ill.
- Rempe Co., Chicago, Ill.
- Rome-Turney Radiator Co., Rome, N. Y.
- Standard Galvanizing Co., Chicago, Ill.
- Stewart Ice Machine Co., Los Angeles, Cal.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Thermal Units Mfg. Co., Meriden, Conn.
- Trane Co., La Crosse, Wis.
- Trenton Auto Radiator Wks., Trenton, N. J.
- Unit Heater & Cooler Co., Wausau, Wis.
- Vilter Mfg. Co., Milwaukee, Wis.
- Whitlock Coil Pipe Co., Hartford, Conn.
- Winchester Repeating Arms Co., New Haven, Conn.
- Wing Mfg. Co., L. J., New York City.
- Wittenmeyer Machinery Co., Chicago, Ill.
- XL Refrigerating Co., Inc., Chicago, Ill.
- York Ice Machinery Corp., York, Pa.
- Young Radiator Co., Racine, Wis.

## COILS, COOLING, WATER

- Advanced Refrigerating Systems Co., Philadelphia, Pa.
- Aerofin Corp., Syracuse, N. Y.
- Airtherm Mfg. Co., St. Louis, Mo.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Beacon-Morris Corp., Boston, Mass.
- Bohn Aluminum & Brass, Detroit, Mich.
- Bush Mfg. Co., Hartford, Conn.
- Clarage Fan Co., Kalamazoo, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Fedders Mfg. Co., Buffalo, N. Y.
- Frick Co., Waynesboro, Pa.
- G & O Mfg. Co., New Haven, Conn.
- General Refrigeration Corporation, Beloit, Wis.

● Advertisement in this issue. See Index to Advertisers, page 168.



Johnson Fan & Blower Corp., Chicago.  
 Kelvinator Div., Nash-Kelvinator Corp., Detroit.  
 McCord Radiator & Mfg. Co., Detroit, Mich.  
 McQuay, Inc., Minneapolis, Minn.  
 Mario Coil Co., St. Louis, Mo.  
 Modine Mfg. Co., Racine, Wis.  
 Peerless of America, Inc., Chicago, Ill.  
 Refrigeration Appliances, Inc., Chicago, Ill.  
 Refrigeration Economics Co., Inc., Canton, O.  
 Reliance Refrigeration Machine Co., Chicago, Ill.  
 Rempe Co., Chicago, Ill.  
 Rome-Turney Radiator Co., Rome, N. Y.  
 Standard Galvanizing Co., Chicago, Ill.  
 ●Star Radiator Co., Los Angeles, Cal.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Thermal Units Mfg. Co., Meriden, Conn.  
 ●Trane Co., La Crosse, Wis.  
 Trenton Auto Radiator Wks., Trenton, N. J.  
 Unit Heater & Cooler Co., Wausau, Wis.  
 Vilter Mfg. Co., Milwaukee, Wis.  
 Whitlock Coil Pipe Co., Hartford, Conn.  
 Wing Mfg. Co., L. J., New York City.  
 XL Refrigerating Co., Inc., Chicago, Ill.  
 York Ice Machinery Corp., York, Pa.  
 Young Radiator Co., Racine, Wis.

## COILS, FIRE POT, HOT WATER

●Air Controls, Inc., Cleveland, O.  
 American Furnace & Foundry Co., Milan, Mich.  
 Beacon-Morris Corp., Boston, Mass.  
 ●Brauer Supply Co., A. G., St. Louis.  
 Deshler Foundry & Machine Works, Deshler, O.  
 Devlin Mfg. Co., Thos., Burlington, N. J.  
 Dowagiac Steel Furnace Co., Dowagiac, Mich.  
 Excelsa Products Corp., Buffalo, N. Y.  
 ●Fox Furnace Div. of American Radiator Co., Elyria, O.  
 Globe Machinery & Supply Co., Des Moines, Ia.  
 Harvey-Whipple, Inc., Springfield, Mass.  
 Hotstream Heater Co., Cleveland, O.  
 Kitson Co., Philadelphia, Pa.  
 Liberty Foundry Co., St. Louis, Mo.  
 Marshall Furnace Co., Marshall, Mich.  
 Melbye Bros., Inc., Chicago, Ill.  
 Metzner Stove Repair Co., Kansas City, Mo.  
 Miller & Son, C. Arthur, Elmira, N. Y.  
 Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.  
 ●Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Nugent Sons, Inc., Thos., New York City.  
 Refrigeration Economics Co., Inc., Canton, O.  
 Rempe Co., Chicago, Ill.  
 Rudy Furnace Co., Dowagiac, Mich.

## COILS, HEATING

Aerofin Corp., Syracuse, N. Y.  
 Airtherm Mfg. Co., St. Louis.  
 American Radiator Co., New York City.  
 Andrews Lead Co., Inc., Long Island City, N. Y.  
 ●Baker Ice Machine Co., Inc., Omaha, Nebr.  
 Bayley Blower Co., Milwaukee, Wis.  
 Bishop & Babcock Mfg. Co., Cleveland, O.  
 Bohn Aluminum & Brass, Detroit.  
 Bush Mfg. Co., Hartford, Conn.  
 ●Clarage Fan Co., Kalamazoo, Mich.  
 Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.  
 Economy Electric Mfg. Co., Cicero, Ill.  
 Fedders Mfg. Co., Buffalo.  
 ●G & O Mfg. Co., New Haven, Conn.  
 Johnson Fan & Blower Corp., Chicago.  
 Kauffman Air Conditioning Corp., St. Louis, Mo.  
 McCord Radiator & Mfg. Co., Detroit, Mich.  
 McQuay, Inc., Minneapolis, Minn.  
 Mario Coil Co., St. Louis, Mo.  
 Modine Mfg. Co., Racine, Wis.  
 Nesbitt, Inc., John J., Philadelphia, Pa.  
 Peerless of America, Inc., Chicago, Ill.  
 Rempe Co., Chicago, Ill.  
 Rome-Turney Radiator Co., Rome, N. Y.  
 Standard Galvanizing Co., Chicago, Ill.  
 ●Star Radiator Co., Los Angeles, Cal.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Taco Heaters, Inc., New York, N. Y.  
 Thermal Units Mfg. Co., Meriden, Conn.  
 ●Trane Co., La Crosse, Wis.  
 Trenton Auto Radiator Wks., Trenton, N. J.  
 Unit Heater & Cooler Co., Wausau, Wis.  
 Wing Mfg. Co., L. J., New York City.  
 York Ice Machinery Corp., York, Pa.  
 Young Radiator Co., Racine, Wis.

## COLLECTORS, BLOW PIPE

Airtherm Mfg. Co., St. Louis, Mo.  
 ●American Air Filter Co., Inc., Louisville, Ky.

American Blower Corp., Detroit.  
 Bayley Blower Co., Milwaukee, Wis.  
 Belanger Fan & Oven Co., Detroit.  
 Blower Application Co., Milwaukee, Wis.  
 Brundage Co., Kalamazoo, Mich.  
 ●Buffalo Forge Co., Buffalo, N. Y.  
 ●Clarage Fan Co., Kalamazoo, Mich.  
 Day Co., Minneapolis, Minn.  
 Dracoo Corp., Cleveland, O.  
 Falstrom Co., Passaic, N. J.  
 Garden City Fan Co., Chicago, Ill.  
 Goethel Co., Alfred C., Milwaukee, Wis.  
 Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.  
 Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.  
 Industrial Sheet Metal Works, Inc., Detroit, Mich.  
 Kirk & Blum Mfg. Co., Cincinnati, O.  
 Lee & Son Co., Thomas, Cincinnati, O.  
 Mahon Co., R. C., Detroit, Mich.  
 Mellish & Murray Co., Chicago, Ill.  
 New York Blower Co., Chicago, Ill.  
 Northern Blower Co., Cleveland, O.  
 Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.  
 Research Corp., New York City.  
 Sly Mfg. Co., W. W., Cleveland, O.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Western Blower Co., Seattle, Wash.  
 Western Precipitation Corp., Los Angeles.  
 Young & Bertke Co., Cincinnati, O.

## COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York City.  
 Acme Refining Co., Cleveland, O.  
 Allmetal Weatherstrip Co., Chicago, Ill.  
 American Metal Weather Strip Co., Grand Rapids, Mich.  
 ●Armstrong Co., Detroit.  
 Asphalt Products Co., Syracuse, N. Y.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Carey Co., Philip, Cincinnati, O.  
 Clinton Metallic Paint Co., Clinton, N. Y.  
 Continental Products Co., Euclid, O.  
 Diamond Metal Weather Strip Co., Columbus, O.  
 Horn Co., A. C., Long Island City, N. Y.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Johns-Manville, New York City.  
 Krehbiel, J. H., Chicago, Ill.  
 Lastik Products Co., Inc., Pittsburgh, Pa.  
 National Mfg. Corp., Tonawanda, N. Y.  
 Ohlmac Paint & Refining Co., Chicago, Ill.  
 Pecora Paint Co., Philadelphia, Pa.  
 Plastic Products Co., Detroit, Mich.  
 ●Pyrolite Products Co., Cleveland, O.  
 Reilly Tar & Chemical Corp., Indianapolis, Ind.  
 Robertson Co., H. H., Pittsburgh.  
 Sauereisen Cements Co., Sharpsburg, Pa.  
 Thompson & Co., Pittsburgh, Pa.  
 Wilhelm Co., A., Reading, Pa.  
 Yardley Screen & Weather Strip Co., Columbus, O.

## COMPOUNDS, GLAZING

Acme Refining Co., Cleveland, O.  
 ●Armstrong Co., Detroit.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Continental Products Co., Euclid, O.  
 Diamond Metal Weather Strip Co., Columbus, O.  
 Goodrich Co., B. F., Akron, O.  
 Horn Co., A. C., Long Island City, N. Y.  
 Lastik Products Co., Inc., Pittsburgh, Pa.  
 Pecora Paint Co., Philadelphia, Pa.  
 Plastic Products Co., Detroit, Mich.  
 ●Pyrolite Products Co., Cleveland, O.  
 Thompson & Co., Pittsburgh, Pa.

## COMPOUNDS, TINNING

American Solder & Flux Co., Philadelphia, Pa.  
 Burnley Battery & Mfg. Co., North East, Pa.  
 Eagle-Picher Lead Co., Cincinnati, O.  
 Lukens Metal Co., Thos. F., Philadelphia, Pa.  
 Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.  
 Potomac Mfg. Co., Philadelphia, Pa.  
 ●Ruby Chemical Co., Columbus, O.

## COMPOUNDS, WATER-PROOFING

Acorn Refining Co., Cleveland, Ohio.  
 American Barlock Co., Inc., Long Island City, N. Y.  
 Asphalt Products Co., Syracuse, N. Y.  
 Barber Co., Inc., Philadelphia, Pa.  
 Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Bird & Son, Inc., East Walpole, Mass.
- Carey Co., Philip, Cincinnati, O.
- Continental Products Co., Euclid, Ohio.
- Gerard Chemical Co., Elizabeth, N. J.
- Johns-Manville, New York City.
- Koppers Co., Pittsburgh.
- Lastik Products Co., Inc., Pittsburgh, Pa.
- Pecora Paint Co., Philadelphia, Pa.
- Pyrolite Products Co., Cleveland.
- Reilly Tar & Chemical Corp., Indianapolis, Ind.
- Robertson Co., H. H., Pittsburgh.
- Sauereisen Cements Co., Sharpsburg, Pa.
- Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.
- Technical Coatings, Inc., New York City.
- Thompson & Co., Pittsburgh, Pa.
- Wilhelm Co., A., Reading, Pa.

## COMPRESSORS, REFRIGERATING

- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- Baker Ice Machine Co., Inc., Omaha, Nebr. (Freon, Methyl, Chloride, Ammonia).
- Brunner Mfg. Co., Utica, N. Y.
- Carrier Corp., Syracuse, N. Y.
- Copeland Refrigeration Corp., Sidney, Ohio.
- Corozone Air Conditioning Corp., The, Cleveland.
- Curtis Refrigerating Machine Co., St. Louis, Mo.
- De La Vergne Engine Co., Philadelphia, Pa.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Frick Co., Waynesboro, Pa.
- General Electric Co., Schenectady, N. Y.
- General Machinery Co., Spokane, Wash. (Ammonia).
- General Refrigeration Corporation, Beloit, Wis.
- Hardy Mfg. Co., Dayton, O.
- Ingersoll-Rand, New York City.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kellogg Compressor & Mfg. Corp., Rochester, N. Y.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Merchant & Evans Co., Philadelphia, Pa.
- Mills Novelty Co., Chicago, Ill.
- Modern Equipment Corp., Defiance, Ohio.
- Nash Refrigeration Co., Inc., Newark, N. J.
- Norge Commercial Div. of Borg-Warner Corp., Detroit, Mich.
- Reliance Refrigeration Machine Co., Chicago, Ill.
- Servel, Inc., Evansville, Ind.
- Stewart Ice Machine Co., Los Angeles, Cal.
- Tecumseh Products Co., Tecumseh, Mich.
- Trane Co., LaCrosse, Wisconsin.
- Uniflow Mfg. Co., Erie, Pa.
- Universal Cooler Corp., Detroit, Mich.
- Vilter Mfg. Co., Milwaukee, Wis.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
- Wittenmeyer Machinery Co., Chicago, Ill.
- Wolfe Engineering & Mfg. Co., Harrisburg, Pa.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- XL Refrigerating Co., Inc., Chicago, Ill.
- York Ice Machinery Corp., York, Pa.

## CONDUCTOR PIPE

*See Pipe, Conductor*

## CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Bonnet Control of Blower)

- Barber-Colman Company, Rockford, Ill.
- Barclay, Inc., Robert, Chicago.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Russell Electric Company, Chicago, Ill.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

## CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Thermostat Control of Blower)

- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- General Controls Co., Glendale, Cal.

- Minneapolis-Honeywell Regulator Co., Minneapolis.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

## CONTROL SYSTEMS, GRAVITY FURNACE, HAND-FIRED (PACKAGE)

- Automatic Products Co., Milwaukee.
- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit, Mich.
- Julien P. Friez & Sons, Baltimore.
- General Controls Co., Glendale, Cal.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Russell Electric Co., Chicago.
- Sheer Co., H. M., Quincy, Ill.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

## CONTROL SYSTEMS, ZONE DISTRIBUTION, COMPLETE

- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Sampel Time Control, Inc., Mendota, Ill.
- White-Rodgers Electric Co., St. Louis.

## CONTROLS, COMBINED FAN AND LIMIT, LINE VOLTAGE

- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Spencer Thermostat Co., Attleboro, Mass.
- White-Rodgers Electric Co., St. Louis.
- United Electric Controls Co., South Boston, Mass.

## CONTROLS, COMBINED FAN AND LIMIT, LOW VOLTAGE

- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Spencer Thermostat Co., Attleboro, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

## CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LINE VOLTAGE

- Cook Electric Co., Chicago.
- Hays Corp., Michigan City, Ind.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Russell Electric Co., Chicago.
- United Electric Controls Co., South Boston, Mass.

## CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LOW VOLTAGE

- Cook Electric Co., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Russell Electric Co., Chicago.
- White Manufacturing Co., St. Paul, Minn.

## CONTROLS, EFFECTIVE TEMPERATURE

- Barber-Colman Co., Rockford, Ill.
- Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Friez & Sons, Julien P., Baltimore.
- H-B Instrument Co., Inc., Philadelphia.
- Johnson Service Co., Milwaukee, Wis.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Powers Regulator Co., Chicago, Ill.
- Precision Thermometer and Instrument Co., Philadelphia.

### CONTROLS, FAN, LINE VOLTAGE

- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Hays Corp., Michigan City, Ind.
- Merco Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Russell Electric Co., Chicago.
- Sheer Co., H. M., Quincy, Ill.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis.

### CONTROLS, FAN, LOW VOLTAGE

- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Julien P. Friez & Sons, Baltimore.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Spencer Thermostat Co., Attleboro, Mass.
- Russell Electric Co., Chicago.
- White-Rodgers Electric Co., St. Louis.
- United Electric Controls Co., South Boston, Mass.
- White Manufacturing Co., St. Paul, Minn.

### CONTROLS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, PNEUMATIC

- Bristol Co., Waterbury, Conn.
- Foxboro Co., Foxboro, Mass.
- Johnson Service Co., Milwaukee, Wis.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- National Regulator Div., Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Powers Regulator Co., Chicago, Ill.
- Taylor Instrument Companies, Rochester, N. Y.

### CONTROLS, LIMIT, LINE VOLTAGE

- Cook Electric Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- Julien P. Friez & Sons, Baltimore, Md.
- Gleason-Avery, Inc., Auburn, N. Y.
- Merco Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Russell Electric Co., Chicago, Ill.
- Sheer Co., H. M., Quincy, Ill.
- Spencer Thermostat Company, Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.

### CONTROLS, LIMIT, LOW VOLTAGE

- Automatic Products Co., Milwaukee, Wis.
- Cook Electric Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- Julien P. Friez & Sons, Baltimore, Md.
- General Controls Co., Glendale, Cal.
- Gleason-Avery, Inc., Auburn, N. Y.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sheer Co., H. M., Quincy, Ill.
- Spencer Thermostat Company, Attleboro, Mass.

- Russell Electric Co., Chicago, Ill.
- United Electric Controls Co., South Boston, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis, Mo.

### CONTROLS, OIL BURNER, COMPLETE ASSEMBLY

- Automatic Temperature Control, Inc., New York City.
- Detroit Lubricator Co., Detroit, Mich.
- General Electric Co., Schenectady, N. Y.
- McCorkle Co., D. H., Berkeley, Cal.
- Merco Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- United Electric Controls Co., South Boston, Mass.

### CONTROLS, STOKER, COMPLETE ASSEMBLY

- Automatic Temperature Control, Inc., New York City.
- Detroit Lubricator Co., Detroit, Mich.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Industrial Engineering Corp., Evansville, Ind.
- Julien P. Friez & Sons, Baltimore.
- Merco Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Paragon Electric Co., Chicago, Ill.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control Inc., Mendota, Ill.
- Spencer Thermostat Co., Attleboro, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.

### CONTROLS, WINDOW CONDENSATION

- Barber-Colman Company, Rockford, Ill.
- Friez & Sons, Julien P., Baltimore, Md.

### COOLING SURFACE *See Coils, Cooling, Water*

### COPPERS, SOLDERING

- Bernz Co., Inc., Otto, Rochester, N. Y.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Electric Materials Co., North East, Pa.
- Electric Soldering Iron Co., Inc., Deep River, Conn.
- Everhot Mfg. Co., Maywood, Ill.
- Gasweld Equipment Co., Chicago, Ill. (Acetylene)
- General Electric Co., Schenectady, N. Y.
- Hussey & Co., C. G., Pittsburgh, Pa.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Linde Air Products Co., New York City.
- Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Revere Copper and Brass, Incorporated, New York City.
- Sight Feed Generator Co., Richmond, Ind.
- Stanley Tools, New Britain, Conn.
- Turner Brass Works, Sycamore, Ill.
- Vulcan Electric Co., Lynn, Mass.
- Welss & Co., H., New York City.

### CORNICES

- American Sheet Metal Works, New Orleans, La.
- Berger Bros. Co., Philadelphia, Pa.
- Biersach & Niedermeyer Co., Milwaukee, Wis.
- Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
- California Cornice, Steel and Supply Corp., Los Angeles, Cal.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Danzer Metal Works Co., Hagerstown, Md.
- Decatur Iron & Steel Co., Decatur, Ala.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Herrmann & Grace Co., Brooklyn, N. Y.
- International Steel Co., Evansville, Ind.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Ledkote Products Co., Long Island City, N. Y.
- Martin Metal Mfg. Co., Wichita, Kan.
- Milcor Steel Co., Milwaukee, Wis.
- Miller & Doing, Inc., Brooklyn, N. Y.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Park City Cornice Works, Inc., Bridgeport, Conn.
- Perkinson & Brown, Chicago, Ill.

●Advertisement in this issue. See Index to Advertisers, page 168.



Perrin Co., Edward C., Camden, N. J.  
 Providence Cornice Co., Providence, R. I.  
 Ryniker Sheet Metal Works, Inc., Billings, Mont.  
 St. Paul Corrugated Co., St. Paul, Minn.  
 Schoedinger Co., F. O., Columbus, O.  
 Southbridge Roofing Co., Inc., Southbridge, Mass.  
 Tiffin Art Metal Co., Tiffin, O.  
 Van Noorden Co., E., Boston, Mass.  
 Willis Mfg. Co., Galesburg, Ill.  
 York Corrugating Co., York, Pa.

## COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Chicago Die Casting Co., Chicago, Ill.  
 Congress Tool & Die Co., Detroit, Mich.  
 Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.  
 De Laval Steam Turbine Co., Trenton, N. J.  
 Dick Co., Inc., R. & J., Passaic, N. J.  
 General Electric Co., Schenectady, N. Y.  
 Lord Mfg. Co., Erie, Pa.  
 Lovejoy Flexible Coupling Co., Chicago, Ill.  
 Medart Co., St. Louis, Mo.  
 Wood's Sons Co., T. B., Chambersburg, Pa.

## DAMPER MOTORS

*See Motors, Damper, Furnace Draft, Electrical*

## DAMPERS, DUCT

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.  
 Air Control Products, Inc., Muskegon, Mich.  
 American Foundry & Furnace Co., Bloomington, Ill.  
 Belanger Fan & Oven Co., Detroit, Mich.  
 Bishop & Babcock Mfg. Co., Cleveland, O.  
 Economy Electric Mfg. Co., Cicero, Ill.  
 Elgo Shutter & Manufacturing Co., Detroit, Mich.  
 Excelsior Steel Furnace Co., Chicago, Ill.  
 Hampden Cornice Works, Springfield, Mass.  
 Howes Co., S. M., Charlestown, Boston, Mass.  
 Industrial Sheet Metal Works, Inc., Detroit, Mich.  
 Iona Ventilator Co., Inc., Philadelphia, Pa.  
 Jacobs Co., B. & J., Cincinnati, O.  
 Jamar Co., Walker, Duluth, Minn.  
 Johnson Service Co., Milwaukee, Wis.  
 K-B-Damper Control, Cincinnati, O.  
 Kirk & Blum Mfg. Co., Cincinnati, O.  
 Maysteel Products, Inc., Mayville, Wis.  
 Mercoide Corp., Chicago, Ill.  
 Milcor Steel Co., Milwaukee, Wis.  
 Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Ohio Products Co., Cleveland, O.  
 United States Register Co., Battle Creek, Mich.  
 Young Regulator Co., Cleveland, O.

## DAMPERS, SMOKE PIPE

Adams Co., Dubuque, Ia.  
 Brauer Supply Co., A. G., St. Louis, Mo.  
 Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.  
 Calesco Corporation, Lynn, Mass.  
 Grand Rapids Die & Tool Co., Grand Rapids, Mich.  
 Griswold Mfg. Co., Erie, Pa.  
 Hart & Cooley Mfg. Co., Chicago, Ill.  
 Jacobs Co., B. & J., Cincinnati, O.  
 Jewett Stove & Foundry Corp., Buffalo, N. Y.  
 Liberty Foundry Co., St. Louis, Mo.  
 Littleford Bros., Cincinnati, O.  
 Maple City Furnace Co., Monmouth, Ill.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 Metzner Stove Repair Co., Kansas City, Mo.  
 Milcor Steel Co., Milwaukee, Wis.  
 Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Preferred Utilities Manufacturing Corp., New York City.  
 Royal-Apex Mfg. Corp., Brooklyn, N. Y.  
 Schoedinger, F. O., Co., Columbus, O.  
 Stove Mfg. & Engine Co., Freeport, Ill.  
 United States Register Co., Battle Creek, Mich.  
 Walker Mfg. & Sales Corp., St. Joseph, Mo.  
 Williamson Heater Co., Cincinnati, O.

## DIFFUSERS, AIR

Air Control Products, Inc., Muskegon, Mich.  
 Anemostat Corporation of America, New York City.  
 Barber-Colman Company, Rockford, Ill.  
 General Refrigeration Corp., Beloit, Wis. (Propeller Type)  
 Preferred Utilities Manufacturing Corp., New York City.  
 United States Register Co., Battle Creek, Mich.  
 Waterloo Register Co., Waterloo, Iowa.

## DOORS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La.  
 Bayer Co., A. J., Los Angeles, Cal.  
 Biersach & Niedermeyer Co., Milwaukee, Wis.  
 Detroit Steel Products Co., Detroit.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 International Steel Co., Evansville, Ind.  
 Maysteel Products, Inc., Mayville, Wis.  
 Metal Door & Trim Co., La Porte, Ind.  
 Newman Brothers, Inc., Cincinnati, O.  
 Perkinson & Brown, Chicago, Ill.  
 Providence Cornice Co., Providence, R. I.  
 Richmond Fireproof Door Co., Richmond, Ind.  
 Truscon Steel Co., Youngstown, O.

## DOORS, KALAMEIN

American Sheet Metal Works, New Orleans, La.  
 Biersach & Niedermeyer Co., Milwaukee, Wis.  
 California Cornice, Steel and Supply Corp., Los Angeles, Cal.  
 Cincinnati Mfg. Co., Cincinnati, O.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Empire Door Co., Inc., New York City.  
 Herrmann & Grace Co., Brooklyn, N. Y.  
 International Steel Co., Evansville, Ind.  
 Lee & Son Co., Thomas, Cincinnati, O.  
 Mahon Co., R. C., Detroit, Mich.  
 Mesker & Co., Geo. L., Evansville, Ind.  
 Newman Brothers, Inc., Cincinnati, O.  
 Perkinson & Brown, Chicago, Ill.  
 Providence Cornice Co., Providence, R. I.  
 Richmond Fireproof Door Co., Richmond, Ind.  
 Syracuse Fire Door Corp., Syracuse, N. Y.  
 Van Noorden Co., E., Boston, Mass.

## DOORS AND SHUTTERS, FIRE

American Sheet Metal Works, New Orleans, La.  
 Bards Range & Foundry Co., E. H., Cincinnati, O.  
 Biersach & Niedermeyer Co., Milwaukee, Wis.  
 Cornell Iron Works, Inc., Long Island City, N. Y.  
 Detroit Steel Products Co., Detroit, Mich.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Empire Door Co., Inc., New York City.  
 Falstrom Co., Passaic, N. J.  
 Herrmann & Grace Co., Brooklyn, N. Y.  
 Industrial Sheet Metal Works, Inc., Detroit, Mich.  
 International Steel Co., Evansville, Ind.  
 Kinnear Mfg. Co., Columbus, O.  
 Mahon Co., R. C., Detroit, Mich.  
 Maysteel Products, Inc., Mayville, Wis.  
 Merchant & Evans Co., Philadelphia, Pa.  
 Mesker & Co., Geo. L., Evansville, Ind.  
 Perkinson & Brown, Chicago, Ill.  
 Providence Cornice Co., Providence, R. I.  
 Richards-Wilcox Mfg. Co., Aurora, Ill.  
 Richmond Fireproof Door Co., Richmond, Ind.  
 Saino Mfg. Co., Inc., F. L., Memphis, Tenn.  
 St. Paul Corrugating Co., St. Paul, Minn.  
 Schoedinger, F. O., Co., Columbus, O.  
 Southbridge Roofing Co., Inc., Southbridge, Mass.  
 Syracuse Fire Door Corp., Syracuse, N. Y.  
 Van Noorden Co., E., Boston, Mass.  
 Western Wire & Iron Works, Inc., Chicago, Ill.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Willis Mfg. Co., Galesburg, Ill.

## DRAFT GAGES

*See Gages, Draft*

## DRAFT REGULATORS

*See Regulators, Furnace Draft, Mechanical*

## DRILLS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md.  
 Clark Jr., Electric Co., Jas., Louisville, Ky.  
 Excelso Products Corp., Buffalo, N. Y.  
 Independent Pneumatic Tool Co., Chicago, Ill.  
 Mall Tool Co., Chicago, Ill.  
 Misener Mfg. Co., Inc., Syracuse, N. Y.  
 Power King Tool Corp., Warsaw, Ind.  
 Signal Electric Mfg. Co., Menominee, Mich.  
 Skillsaw, Inc., Chicago, Ill.  
 Speedway Mfg. Co., Cicero, Ill.  
 Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.  
 Wodack Electric Tool Corp., Chicago, Ill.

● Advertisement in this issue. See Index to Advertisers, page 168.

## DUCTS AND FITTINGS, PREFABRICATED

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Tin Plate and Roofing Supply Co., Philadelphia, Pa.
- Carey Co., Philp, Cincinnati, O.
- Champion Furnace Pipe Co., Peoria, Ill.
- Chandler Co., Cedar Rapids, Ia.
- Char-Gale Mfg. Co., Minneapolis, Minn.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Corbman Bros., Inc., Philadelphia, Pa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Gerstein & Cooper, South Boston, Mass.
- Henry Furnace & Foundry Co., Cleveland, O.
- Howes Co., S. M., Charlestown, Boston.
- Lamneck Products, Inc., Columbus, O.
- Maysteel Products, Inc., Mayville, Wis.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee, Wis.
- Moncrief Furnace Co., Atlanta, Ga.
- United States Register Co., Battle Creek, Mich.

## EAVES TROUGH FITTINGS AND ACCESSORIES

*See Fittings and Accessories, Eaves Trough and Gutter*

## EAVES TROUGH AND GUTTERS

- American Sheet Metal Works, New Orleans, La.
- Ames Co., W. R., San Francisco, Cal.
- Anderson Mfg. Co., Des Moines, Ia.
- Barnes Metal Products Co., Chicago, Ill.
- Berger Bros. Co., Philadelphia, Pa.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Braden Mfg. Co., Terre Haute, Ind.
- Bridgesburg Foundry Co., Philadelphia, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Danzer Metal Works Co., Hagerstown, Md.
- Decatur Iron & Steel Co., Decatur, Ala.
- Downs-Smith Brass & Copper Co., New York City.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Hussey & Co., C. G., Pittsburgh, Pa.
- International Steel Co., Evansville, Ind.
- Klauer Mfg. Co., Dubuque, Ia.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Ledkote Products Co., Long Island City, N. Y.
- Lyman Co., H. B., Southampton, Mass.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Martin Metal Mfg. Co., Wichita, Kan.
- Milcor Steel Co., Milwaukee, Wis. (Square Hanging)
- Miller & Doing, Inc., Brooklyn, N. Y.
- New Delphos Mfg. Co., Delphos, O.
- Newport Rolling Mill Co., Newport, Ky.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Providence Cornice Co., Providence, R. I.
- Reeves Steel & Mfg. Co., Dover, O.
- Ryniker Sheet Metal Works, Inc., Billings, Mont.
- St. Paul Corrugating Co., St. Paul, Minn.
- Schoedinger, F. O., Co., Columbus, O.
- Sheet Metal Products Co., Peoria, Ill.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Tiffin Art Metal Co., Tiffin, O.
- Van Noorden Co., E., Boston, Mass.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.
- Williams-Wallace Co., San Francisco.
- Willis Mfg. Co., Galesburg, Ill.
- Woolwine Metal Products Co., Los Angeles, Cal.
- York Corrugating Co., York, Pa.

## ELBOWS, BLOW PIPE

*See Fittings, Blow Pipe*

## ELBOWS, CONDUCTOR

*See Fittings and Accessories, Conductor*

## ELBOWS, FURNACE PIPE

*See Fittings and Accessories, Furnace Pipe*

## ELECTRIC WELDERS

*See Welders, Arc, Spot*

## ELECTRODES, ARC WELDING

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- American Brass Co., Waterbury, Conn.
- American Chain Co., Inc., Bridgeport, Conn.
- American Steel & Wire Co., Chicago, Ill.
- Central Steel & Wire Co., Chicago, Ill.

- Chicago Steel & Wire Co., Chicago, Ill.
- Crucible Steel Co. of America, New York City.
- General Electric Co., Schenectady, N. Y.
- Harnischfeger Corp., Milwaukee.
- Hollup Corp., Chicago, Ill.
- Lee & Son Co., K. O., Aberdeen, S. D.
- Lincoln Electric Co., Cleveland, O.
- Marquette Mfg. Co., Inc., Minneapolis, Minn.
- Maurath, Inc., Cleveland, O.
- McKay Co., Pittsburgh.
- Metal & Thermit Corp., New York City.
- Roebbling's Sons Co., John A., Trenton, N. J.
- Torchweld Equipment Co., Chicago, Ill.
- Universal Power Corp., Cleveland, O.
- Westinghouse Electric & Mfg. Co., East Pittsburgh.
- Wilson Welder & Metals Co., Inc., New York City.

## ENAMELS & LACQUERS

- Continental Products Co., Euclid, Ohio.
- Debevoise Co., Brooklyn, N. Y.
- du Pont de Nemours & Co., E. I., Wilmington, Del.
- Hague & Co., Inc., Alfred, Brooklyn, N. Y.
- Hilo Varnish Corp., Brooklyn, N. Y.
- Maas & Waldstein Co., Newark, N. J.
- O'Brien Varnish Co., South Bend, Ind.
- Pierce & Stevens, Inc., Buffalo, N. Y.
- Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
- Wipe-On Corporation, Ind. Div., New York City.
- Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.

## FACES, COLD AIR, METAL

- American Foundry & Furnace Co., Bloomington, Ill.
- Auer Register Co., Cleveland, O.
- Best Register Co., Milwaukee, Wis.
- Diamond Mfg. Co., Wyoming, Pa.
- Gillian Mfg. Co., Ferndale, Michigan.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- Hendrick Mfg. Co., Carbondale, Pa.
- Independent Register Co., Cleveland, O.
- Keith Furnace Co., Des Moines, Ia. (Cast)
- Lamneck Products, Inc., Columbus, O.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Middleton Mfg. Co. H. C., Minneapolis, Minn.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Rock Island Register Co., Rock Island, Ill.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Waterloo Register Co., Waterloo, Ia.
- Williamson Heater Co., Cincinnati, O.

## FACES, COLD AIR, WOOD

- American Wood Register Co., Plymouth, Ind.
- Antigo Building Supply Co., Antigo, Wis.
- Best Register Co., Milwaukee, Wis.
- Eaglesfield Ventilator Co., Indianapolis, Ind.
- Garber Lumber & Construction Co., Strasburg, O.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Marsh Lumber Co., Dover, O.
- McClure Builders' Supply Co., East Palestine, O.
- Milcor Steel Co., Milwaukee.
- Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Rock Island Register Co., Rock Island, Ill.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Wooster Art Wood, Inc., Wooster, O.

## FAN (PROPELLER)—FILTER UNITS

- Air Controls, Inc., Cleveland, O.
- Belanger Fan & Oven Co., Detroit, Mich.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chicago Steel Furnace Co., Chicago, Ill.
- Forst-Air Co., Rockford, Ill.
- Henry Furnace & Foundry Co., Cleveland, O.
- International Engineering, Inc., Dayton, O.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Russell Electric Co., Chicago, Ill.
- Russell Insulation Co., The, F. C., Cleveland, O.
- Standard Furnace & Supply Co., Omaha, Nebr.

## FANS, BOOSTER, COLD AIR RETURN

- A-C Mfg. Co., Pontiac, Ill.
- Advance Aluminum Castings Corp., Chicago, Ill.

● Advertisement in this issue. See Index to Advertisers, page 168.

Aire-Foile Fan & Blower Company, Detroit, Mich.  
 Autovent Fan Co., Piqua, O.  
 ● Autovent Fan & Blower Co., Chicago, Ill.  
 Berns Specialty Co., Chicago, Ill.  
 ● Brumme Mfg. Co., Chicago, Ill.  
 Brundage Co., Kalamazoo, Mich.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Cary Mfg. Co., Waupaca, Wis.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.  
 Economy Electric Mfg. Co., Cicero, Ill.  
 Forst-Air Co., Rockford, Ill.  
 Garden City Fan Co., Chicago.  
 General Regulator Corp., Chicago, Ill.  
 International Engineering, Inc., Dayton, O.  
 ● Peerless Electric Co., Warren, O.  
 Roan Mfg. Co., Racine, Wis.  
 Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Universal Blower Co., Birmingham, Mich.  
 Western Blower Co., Seattle, Wash.

## FANS, BOOSTER, ONE-PIPE WARM AIR

Aire-Foile Fan & Blower Co., Detroit, Mich.  
 ● Brumme Mfg. Co., Chicago, Ill.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Climatemaker Corp., Nashville, Tenn.  
 Economy Electric Mfg. Co., Cicero, Ill.  
 Forst-Air Co., Rockford, Ill.  
 Kisco Company, Inc., St. Louis.  
 Meier Electric & Machine Co., Indianapolis, Ind.  
 ● Mueller Furnace Co., L. J., Milwaukee.  
 ● Victor Electric Products, Inc., Cincinnati, O.

## FANS, FURNACE, PROPELLER TYPE

Advance Aluminum Castings Corp., Chicago, Ill.  
 ● Air Controls, Inc., Cleveland, O.  
 Aire-Foile Fan & Blower Co., Detroit, Mich.  
 American Coolair Corp., Jacksonville, Fla.  
 Arex Co., Chicago, Ill.  
 ● Autovent Fan & Blower Co., Chicago, Ill.  
 Belanger Fan & Oven Co., Detroit.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Campbell Heating Co., E. K., Kansas City, Mo.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Chicago Steel Furnace Co., Chicago, Ill.  
 Columbus Heating & Ventilating Co., Columbus, O.  
 De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.  
 Economy Electric Manufacturing Co., Cicero, Ill.  
 Forst-Air Co., Rockford, Ill.  
 Fraser Furnace Co., Inc., Stockton, Cal.  
 Garden City Fan Co., Chicago, Ill.  
 General Blower Co., Philadelphia, Pa.  
 General Regulator Corp., Chicago, Ill.  
 Haynes Furnace Fan Co., Kansas City, Mo.  
 ● Henry Furnace & Foundry Co., Cleveland, O.  
 Home Furnace Co., Holland, Mich.  
 International Engineering, Inc., Dayton, O.  
 Johnston Co., Wm. W., Dayton, O.  
 Lennox Furnace Co., Marshalltown, Ia.  
 McPherson Furnace & Supply Co., Portland, Ore.  
 Meier Electric & Machine Co., Indianapolis, Ind.  
 Mohr-Air Co., Marlon, O.  
 New York Blower Co., Chicago, Ill.  
 ● Peerless Electric Co., Warren, O.  
 Propellair, Inc., Springfield, O.  
 Reed Unit-Fans, Inc., New Orleans, La.  
 Russell Electric Co., Chicago, Ill.  
 ● Schwitzer-Cummins Co., Indianapolis, Ind.  
 Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Universal Blower Co., Birmingham, Mich.  
 ● Utility Fan Corporation, Los Angeles, Cal.  
 ● Victor Electric Products, Inc., Cincinnati, O.  
 Western Blower Co., Seattle, Wash.  
 Wing Mfg. Co., L. J., New York City.

## FANS, KITCHEN EXHAUST

Aerovent Fan Co., Piqua, O.  
 Air Conditioning Products Co., Detroit, Mich.  
 Aire-Foile Fan & Blower Co., Detroit, Mich.  
 Airmaster Corp., Chicago, Ill.  
 Airtherm Mfg. Co., St. Louis.  
 ● Allen Corp., Detroit, Mich.  
 American Blower Corp., Detroit, Mich.  
 American Coolair Corp., Jacksonville, Fla.  
 Arex Co., Chicago, Ill.  
 ● Autovent Fan & Blower Co., Chicago, Ill.  
 Barrett Engineers, Cleveland Heights, O.  
 Belanger Fan & Oven Co., Detroit.

Berns Specialty Co., Chicago, Ill.  
 Birmingham Fan Mfg. Co., Birmingham, Ala.  
 Bishop & Babcock Mfg. Co., Cleveland, O.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 ● Clarage Fan Co., Kalamazoo, Mich.  
 De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.  
 Diehl Mfg. Co., Elizabethport, N. J.  
 Economy Electric Manufacturing Co., Cicero, Ill.  
 Electrovent Corp., Detroit, Mich.  
 Electrovent Fan & Mfg. Co., Chicago, Ill.  
 Emerson Electric Mfg. Co., St. Louis, Mo.  
 Forst-Air Co., Rockford, Ill.  
 Garden City Fan Co., Chicago, Ill.  
 Gas City Glass Co., Gas City, Ind.  
 General Blower Co., Philadelphia, Pa.  
 General Electric Co., Schenectady, N. Y.  
 General Regulator Corp., Chicago, Ill.  
 Hirschman Co., Inc., W. F., Buffalo, N. Y.  
 Ilg Electric Ventilating Co., Chicago, Ill.  
 International Engineering, Inc., Dayton, O.  
 Jordan & Co., Paul R., Indianapolis, Ind.  
 King Ventilating Co., Owatonna, Minn.  
 Kisco Company, Inc., St. Louis, Mo.  
 Majestic Co., Huntington, Ind.  
 Midwest Ventilating Works, Milwaukee, Wis.  
 Myers Electric Co., Pittsburgh, Pa.  
 New York Blower Co., Chicago, Ill.  
 ● Peerless Electric Co., Warren, O.  
 Propellair, Inc., Springfield, O.  
 Pryne & Co., Inc., Los Angeles, Cal.  
 Reed Unit-Fans, Inc., New Orleans, La.  
 Robbins & Myers, Inc., Springfield, O.  
 Russell Insulation Co., F. C., Cleveland, O.  
 Signal Electric Mfg. Co., Menominee, Mich.  
 Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Universal Blower Co., Birmingham, Mich.  
 U. S. Air Conditioning Corp., Minneapolis, Minn.  
 Utility Fan & Mfg. Co., Los Angeles, Cal.  
 ● Victor Electric Products, Inc., Cincinnati, O.  
 Wagner Electric Corp., St. Louis, Mo.  
 Ward Mfg. Co., Detroit, Mich.  
 Western Blower Co., Seattle, Wash.  
 ● Utility Fan Corporation, Los Angeles, Cal.

## FANS, NIGHT AIR COOLING, COMPLETE UNIT

● Air Controls Inc., Cleveland, O.  
 Aire-Foile Fan & Blower Co., Detroit, Mich.  
 Airmaster Corp., Chicago, Ill.  
 ● Allen Corporation, Detroit, Mich.  
 American Blower Corp., Detroit, Mich.  
 American Coolair Corp., Jacksonville, Fla.  
 American Radiator Co., New York City.  
 ● Autovent Fan & Blower Co., Chicago, Ill.  
 Belanger Fan & Oven Co., Detroit, Mich.  
 Birmingham Fan Mfg. Co., Birmingham, Ala.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Chelsea Fan & Blower Co., Inc., New York City.  
 Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.  
 Economy Electric Mfg. Co., Cicero, Ill.  
 Electrovent Fan & Mfg. Co., Chicago, Ill.  
 Emerson Electric Mfg. Co., St. Louis, Mo.  
 General Blower Co., Philadelphia, Pa.  
 General Regulator Corp., Chicago, Ill.  
 Hirschman Co., Inc., W. F., Buffalo, N. Y.  
 Ilg Electric Ventilating Co., Chicago, Ill.  
 International Engineering, Inc., Dayton, O.  
 Iona Ventilator Co., Inc., Philadelphia, Pa.  
 Johnson Fan & Blower Corp., Chicago, Ill.  
 Jordan & Co., Paul R., Indianapolis, Ind.  
 King Ventilating Co., Owatonna, Minn.  
 Kisco Company, Inc., St. Louis, Mo.  
 ● Lau Blower Co., Dayton, O.  
 Lohman, Inc., William J., New York City.  
 Marathon Electric Mfg. Corp., Wausau, Wis.  
 Mellish & Murray Co., Chicago, Ill.  
 New York Blower Co., Chicago, Ill.  
 ● Peerless Electric Co., Warren, O.  
 Preferred Utilities Mfg. Corp., New York City.  
 Propellair, Inc., Springfield, O.  
 Reed Unit-Fans, Inc., New Orleans, La.  
 Robbins & Myers, Inc., Springfield, O.  
 Russell Insulation Co., F. C., Cleveland, O.  
 ● Schwitzer-Cummins Co., Indianapolis, Ind.  
 South Bend Air Products, Inc., South Bend, Ind.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 ● Todd Air Conditioning Co., Inc., Bonner Springs, Kan.  
 Universal Blower Co., Birmingham, Mich.  
 U. S. Air Conditioning Corp., Minneapolis, Minn.  
 ● Utility Fan Corporation, Los Angeles, Cal.  
 ● Victor Electric Products, Inc., Cincinnati, O.  
 ● Viking Air Conditioning Corp., Cleveland, O.  
 Western Blower Co., Seattle, Wash.  
 Wood Industries, Inc., Gar, Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.



## FANS, VENTILATING, PROPELLER TYPE (Capacity 4,000 c.f.m. up)

- Advance Aluminum Casting Corp., Chicago, Ill.
- Aerovent Fan Co., Piqua, O.
- Air Conditioning Products Co., Detroit, Mich.
- Air Controls Inc., Cleveland, O.
- Aircraft Mfg. Co., Dayton, O.
- Air Devices Corp., Meriden, Conn.
- Aire-Folle Fan & Blower Co., Detroit, Mich.
- Airmaster Corp., Chicago, Ill.
- Allen Corp., Detroit, Mich.
- American Blower Corp., Detroit, Mich.
- American Coolair Corp., Jacksonville, Fla.
- Ames Co., W. R., San Francisco, Cal.
- Arex Co., Chicago, Ill.
- Autovent Fan & Blower Co., Chicago, Ill.
- Bayley Blower Co., Milwaukee, Wis.
- Belanger Fan & Oven Co., Detroit, Mich.
- Berns Specialty Co., Chicago, Ill.
- Birmingham Fan Mfg. Co., Birmingham, Ala.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Blower Application Company, Milwaukee, Wis.
- Buffalo Forge Co., Buffalo, N. Y.
- Burt Mfg. Co., Akron, O.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., New York City.
- Clarage Fan Co., Kalamazoo, Mich.
- Clay Equipment Corp., Cedar Falls, Ia.
- Columbus Heating & Ventilating Co., Columbus, O.
- Coppus Engineering Corp., Worcester, Mass.
- Davenport Mfg. Co., Meadville, Pa.
- De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.
- DeVilbiss Co., Toledo, O.
- Diehl Mfg. Co., Elizabethport, N. J.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago, Ill.
- Emerson Electric Mfg. Co., St. Louis, Mo.
- Evry-Use Products, Inc., New York City.
- Forst-Air Co., Rockford, Ill.
- Fresh'nd-Aire Co., Chicago, Ill.
- Garden City Fan Co., Chicago, Ill.
- Gas City Glass Co., Gas City, Ind.
- General Blower Co., Philadelphia, Pa.
- General Regulator Corp., Chicago, Ill.
- Grand Rapids Blow Pipe and Dust Arrestor Co., Grand Rapids, Mich.
- Hartzell Propeller Fan Co., Piqua, O.
- Hirschman Co., Inc., W. F., Buffalo, N. Y.
- Holtum Mfg. Co., Freeport, Ill.
- Hudson Equipment Corp., Minneapolis, Minn.
- Ilg Electric Ventilating Co., Chicago, Ill.
- International Engineering, Inc., Dayton, O.
- Johnson Fan & Blower Corp., Chicago, Ill.
- Johnston & Co., Wm. W., Dayton, O.
- Jordan & Co., Paul R., Indianapolis, Ind.
- King Ventilating Co., Owatonna, Minn.
- Kisco Company, Inc., St. Louis, Mo.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Meier Electric & Machine Co., Indianapolis, Ind.
- Mountain States Equipment Co., Denver, Colo.
- Myers Electric Co., Pittsburgh, Pa.
- New York Blower Co., Chicago, Ill.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Reed Unit-Fans, Inc., New Orleans, La.
- Russell Insulation Co., F. C., Cleveland, O.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Signal Electric Mfg. Co., Menominee, Mich.
- South Bend Air Products, Inc., South Bend, Ind.
- Star Electric Motor Co., Bloomfield, N. J.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Swift Manufacturing Co., Detroit, Mich.
- Thermal Units Mfg. Co., Meriden, Conn.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utility Fan Corporation, Los Angeles, Cal.
- Victor Electric Products, Inc., Cincinnati, O.
- Viking Air Conditioning Corp., Cleveland, O.
- Western Blower Co., Seattle, Wash.
- Western Engineering & Mfg. Co., Los Angeles, Cal.
- Wing Mfg. Co., L. J., New York City.

## FILTERS, AIR, AUTOMATIC

- American Air Filter Co., Inc., Louisville, Ky.
- Coppus Engineering Corp., Worcester, Mass.
- Dracco Corp., Cleveland, O.
- Hugo Mfg. Co., West Duluth, Minn.
- Independent Air Filter Co., Chicago, Ill.
- Northern Blower Co., Cleveland, O.
- Sly Mfg. Co., W. W., Cleveland, O.

Staynew Filter Corp., Rochester, N. Y.  
 Universal Air Filter Corp., Duluth, Minn.  
 Westinghouse Electric & Mfg. Co., Cleveland. (Electrostatic Precipitator)

## FILTERS, AIR, UNIT, CLEANABLE

- Air Maze Corp., Cleveland, O.
- American Air Filter Co., Inc., Louisville, Ky.
- American Foundry & Furnace Co., Bloomington, Ill.
- Amirton Co., Inc., New York City.
- Annis Air Filters, Glendale, Cal.
- Blocksom & Company, Michigan City, Ind.
- Chicago Air Filter Co., Joliet, Ill.
- Coppus Engineering Corp., Worcester, Mass.
- Davies Air Filter Corp., New York, N. Y.
- Dracco Corp., Cleveland, O.
- Felters Co., Inc., Boston, Mass.
- Hugo Mfg. Co., West Duluth, Minn.
- Independent Air Filter Co., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kleenaire Corp., Stevens Point, Wis.
- Sly Mfg. Co., W. W., Cleveland.
- Somers, Inc., H. J., Detroit, Mich.
- Staynew Filter Corp., Rochester, N. Y.
- Supreme Air Filter Co., New York City.
- Tuttle Air Filter Co., Inc., Louisville, Ky.
- Universal Air Filter Corp., Duluth, Minn.

## FILTERS, AIR, UNIT, THROWAWAY

- American Air Filter Co., Inc., Louisville, Ky.
- American Radiator Co., New York, N. Y.
- Blocksom & Company, Michigan City, Ind.
- Chicago Air Filter Co., Joliet, Ill.
- Fox Furnace, Div. of American Radiator Co., Elyria, O.
- Gehri Company, Tacoma, Wash.
- Independent Air Filter Co., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kleenaire Corp., Stevens Point, Wis.
- Owens-Corning Fiberglas Corp., Toledo, O.
- Plymouth Cordage Co., N. Plymouth, Mass. (Anderson Products, Inc., Cambridge, Mass., National Sales Agents)
- Research Products Corp., Madison, Wis.
- Staynew Filter Corp., Rochester, N. Y.
- Tuttle Air Filter Co., Inc., Louisville, Ky.
- Wilson & Co., Chicago, Ill.

## FIRE BRICK

See Refractories

## FITTINGS AND ACCESSORIES, CONDUCTOR (Elbows, Heads, Hooks, Shoes, Straps, etc.)

- Ames Co., W. R., San Francisco.
- Barnes Metal Products Co., Chicago, Ill.
- Berger Bros. Co., Philadelphia, Pa.
- Berger Mfg., Div. of Republic Steel Corp., Canton, O.
- Boyd & Co., Inc., Chas. P., Philadelphia.
- Braden Mfg. Co., Terre Haute, Ind.
- Brex & Bieler, Inc., Brooklyn, N. Y.
- Char-Gale Mfg. Co., Minneapolis, Minn.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Crary Mfg. Co., Middleport, O. (Cut-off.)
- Danzer Metal Works Co., Hagerstown, Md.
- Dieckmann Co., Ferdinand, Cincinnati, O.
- Downs-Smith Brass & Copper Co., New York City.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Hussey & Co., C. G., Pittsburgh, Pa.
- Iwan Bros., South Bend, Ind.
- Jeliff Mfg. Corp., C. O., Southport, Conn.
- Klauer Mfg. Co., Dubuque, Ia.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Levow, David, New York City.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Martin Metal Mfg. Co., Wichita, Kan.
- Maysteel Products, Inc., Mayville, Wis.
- Milcor Steel Co., Milwaukee, Wis.
- Miller & Doing, Inc., Brooklyn, N. Y.
- New Delphos Mfg. Co., Delphos, O.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Perrin Co., Edward C., Camden, N. J.
- Providence Cornice Co., Providence, R. I.
- Royal-Apex Mfg. Corp., Brooklyn, N. Y.
- Royal Metal Products Co., Brooklyn, N. Y.
- St. Paul Corrugating Co., St. Paul, Minn.
- Schoedinger Co., F. O., Columbus, O.
- Sheet Metal Products Co., Peoria, Ill.
- Stewart Foundry, O. S., Cleveland, O. (Iron Conductor Shoes)

• Advertisement in this issue. See Index to Advertisers, page 168.

Tiffin Art Metal Co., Tiffin, O.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.  
 ●Williams-Wallace Co., San Francisco.  
 Willis Mfg. Co., Galesburg, Ill.  
 Woolwine Metal Products Co., Los Angeles, Cal.

## FITTINGS AND ACCESSORIES, EAVES TROUGH AND GUTTER

(Hangers, Strainers, Miters, Ends, Thimbles, etc.)

Abbott Mfg. Co., Painesville, O. (Hangers)  
 Ames Co., W. R., San Francisco.  
 Barnes Metal Products Co., Chicago, Ill.  
 ●Berger Bros. Co., Philadelphia, Pa.  
 Berger Mfg., Div. of Republic Steel Corp., Canton, O.  
 Bertram Mfg. Co., Chicago, Ill.  
 Braden Mfg. Co., Terre Haute, Ind.  
 California Cornice, Steel and Supply Corp., Los Angeles, Cal.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 ●Chicago Metal Mfg. Co., Chicago, Ill.  
 ●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Downs-Smith Brass & Copper Co., New York City.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Grand Rapids Wire Products Co., Grand Rapids, Mich.  
 ●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)  
 Iwan Brothers, South Bend, Ind.  
 Klauer Mfg. Co., Dubuque, Ia.  
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
 Lamb & Ritchie Co., Cambridge, Mass.  
 Ledkote Products Co., Long Island City, N. Y.  
 ●Levow, David, New York City.  
 Lyman Co., H. B., Southampton, Mass.  
 ●Lyon, Conklin & Co., Inc., Baltimore, Md.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 New Delphos Mfg. Co., Delphos, O.  
 Ohio Wire Products Co., Dover, O. (Hangers)  
 ●Osborn Co., J. M. & L. A., Cleveland, O.  
 Providence Cornice Co., Providence, R. I.  
 Reeves Steel & Mfg. Co., Dover, O.  
 Royal-Apex Mfg. Corp., Brooklyn, N. Y.  
 St. Paul Corrugating Co., St. Paul, Minn.  
 Sheet Metal Products Co., Peoria, Ill.  
 Snap-On Mfg. Co., Chicago, Ill. (Hangers)  
 Southbridge Roofing Co., Inc., Southbridge, Mass.  
 Tiffin Art Metal Co., Tiffin, O.  
 U. S. Cistern Filter Mfg. Co., Bloomington, Ill.  
 Waddell, Bruce, Indianapolis, Ind.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.  
 ●Williams-Wallace Co., San Francisco.  
 Willis Mfg. Co., Galesburg, Ill.  
 Woolwine Metal Products Co., Los Angeles, Cal.

## FITTINGS AND ACCESSORIES, FURNACE PIPE

(Angles, Boots, Elbows, Heads, Joints, Offsets, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.  
 Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.  
 Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.  
 Bergstrom Mfg. Corp., Neenah, Wis.  
 Braden Mfg. Co., Terre Haute, Ind.  
 Budke Stampings Co., Canonsburg, Pa.  
 California Cornice, Steel & Supply Corp., Los Angeles.  
 Campbell Heating Co., Des Moines, Ia.  
 Cary Mfg. Co., Waupaca, Wis.  
 Champion Furnace Pipe Co., Peoria, Ill.  
 ●Chicago Metal Mfg. Co., Chicago, Ill.  
 ●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
 Cincinnati Stamping Co., Cincinnati, O.  
 Corbman Bros., Inc., Philadelphia, Pa.  
 ●Excelsior Steel Furnace Co., Chicago, Ill.  
 Farquhar Furnace Co., Wilmington, O.  
 Green Fdry. & Furnace Wks., Des Moines, Iowa.  
 ●Henry Furnace & Foundry Co., Cleveland, O.  
 Home Furnace Co., Holland, Mich.  
 Howe & Bassett Co., Inc., Rochester, N. Y. (Boots)  
 Howes Co., S. M., Charlestown, Boston, Mass.  
 International Heater Co., Utica, N. Y.  
 Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.  
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
 (Elbows and pipe only.)  
 ●Lamneck Products, Inc., Columbus, O.  
 Lyman Co., H. B., Southampton, Mass.  
 ●Lyon, Conklin & Co., Inc., Baltimore, Md.  
 Majestic Co., Huntington, Ind.  
 Maple City Furnace Co., Monmouth, Ill.  
 Marshall Furnace Co., Marshall, Mich.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ●Meyer & Bro. Co., F., Peoria, Ill.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 Monarch Furnace Fittings Manufacturers, Chicago, Ill.  
 Montag Stove & Furnace Works, Portland, Ore.  
 ●Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Norman Sheet Metal Mfg. Co., Nevada, Mo.

●Osborn Co., J. M. & L. A., Cleveland, O.  
 ●Pacific Gas Radiator Co., Los Angeles, Cal.  
 Parkersburg Iron & Steel Co., Parkersburg, W. Va.  
 Payne Furnace & Supply Co., Beverly Hills, Cal.  
 ●Peerless Foundry Co., Indianapolis, Ind.  
 Portland Stove Foundry Co., Portland, Me.  
 Providence Cornice Co., Providence, R. I.  
 Reeves Steel & Mfg. Co., Dover, O.  
 Roberts-Hamilton Co., Minneapolis, Minn.  
 ●Rock Island Register Co., Rock Island, Ill.  
 Schechter Brothers Co., Philadelphia, Pa.  
 Standard Furnace & Supply Co., Omaha, Nebr.  
 Sterling Foundry Co., Sterling, Ill. (Cast Iron)  
 Stratton & Terstegge Co., Louisville, Ky.  
 Tiffin Art Metal Co., Tiffin, O.  
 ●Tuttle & Bailey, Inc., New Britain, Conn. (Turning blades)  
 ●United States Register Co., Battle Creek, Mich.  
 ●Waterman-Waterbury Co., Minneapolis.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Williamson Heater Co., Cincinnati, O.

## FITTINGS AND ACCESSORIES, SMOKE PIPE

(Draw-bands, Clean-outs, Collars, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.  
 Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.  
 Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.  
 Bardes Range & Foundry Co., E. H., Cincinnati, O.  
 Bergstrom Mfg. Corp., Neenah, Wis.  
 Braden Mfg. Co., Terre Haute, Ind.  
 ●Brauer Supply Co., A. G., St. Louis, Mo.  
 Brex & Bieler, Inc., Brooklyn, N. Y.  
 Cary Mfg. Co., Waupaca, Wis.  
 Champion Furnace Pipe Co., Peoria, Ill.  
 ●Chicago Metal Mfg. Co., Chicago, Ill.  
 ●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
 Cincinnati Stamping Co., Cincinnati, O.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Detroit Safety Furnace Pipe Co., Detroit, Mich.  
 ●Excelsior Steel Furnace Co., Chicago, Ill.  
 Green Fdry. & Furnace Wks., Des Moines, Iowa.  
 Harold Furnace Mfg. Co., Spokane, Wash.  
 ●Henry Furnace & Foundry Co., Cleveland, O.  
 Home Furnace Co., Holland, Mich.  
 Howes Co., S. M., Charlestown, Boston, Mass.  
 International Heater Co., Utica, N. Y.  
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
 ●Lamneck Products, Inc., Columbus, O.  
 Lyman Co., H. B., Southampton, Mass.  
 ●Lyon, Conklin & Co., Inc., Baltimore, Md.  
 Majestic Co., Huntington, Ind.  
 Maple City Furnace Co., Monmouth, Ill.  
 Marshall Furnace Co., Marshall, Mich.  
 Martin Metal Co., Wichita, Kan.  
 ●Meyer & Bro. Co., F., Peoria, Ill.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 Montag Stove & Furnace Works, Portland, Ore.  
 ●Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.  
 ●Osborn Co., J. M. & L. A., Cleveland, O.  
 Patten Co., J. V., Sycamore, Ill.  
 Peacard Co., M. A., Boston.  
 ●Peerless Foundry Co., Indianapolis, Ind.  
 Portland Stove Foundry Co., Portland, Me.  
 Providence Cornice Co., Providence, R. I.  
 Ramey Mfg. Co., Columbus, Ohio.  
 Reeves Steel & Mfg. Co., Dover, O.  
 Roberts-Hamilton Co., Minneapolis, Minn.  
 ●Rock Island Register Co., Rock Island, Ill.  
 Schechter Brothers Co., Philadelphia, Pa.  
 Schoedinger, F. O., Columbus, O.  
 Standard Furnace & Supply Co., Omaha, Nebr.  
 Stratton & Terstegge Co., Louisville, Ky.  
 Tierney Rotor Ventilator Co., Minneapolis, Minn.  
 Tiffin Art Metal Co., Tiffin, O.  
 ●United States Register Co., Battle Creek, Mich.  
 ●Waterman-Waterbury Co., Minneapolis.  
 Wilder Manufacturing Co., Niles, O.  
 Williamson Heater Co., Cincinnati, O.  
 ●Wise Furnace Co., Akron, O.

## FITTINGS, BLOW PIPE

(Elbows, Flanges, Hangers, Hoods and Sweeps, Joints, Rings, Tubing)

Acer & Whedon, Inc., Medina, N. Y.  
 Airtherm Mfg. Co., St. Louis, Mo.  
 Blower Application Co., Milwaukee, Wis.  
 ●Chicago Metal Mfg. Co., Chicago, Ill.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Day Co., Minneapolis, Minn.  
 Falstrom Co., Passaic, N. J.  
 Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.  
 Goethel Co., Alfred C., Milwaukee, Wis.  
 Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.

Industrial Sheet Metal Works, Inc., Detroit, Mich.  
 Kirk & Blum Mfg. Co., Cincinnati, O.  
 Lee & Son Co., Thomas, Cincinnati, O.  
 Mahon Co., R. C., Detroit, Mich.  
 ● Meyer & Bro. Co., F., Peoria, Ill.  
 Providence Cornice Co., Providence, R. I.  
 Puhl & Hepper Mfg. Co., Inc., St. Louis.  
 Tiffin Art Metal Co., Tiffin, Ohio.  
 ● United States Register Co., Battle Creek, Mich.  
 Western Blower Co., Seattle, Wash.  
 Young & Bertke Co., Cincinnati, O.

## FITTINGS, HUMIDIFIER, WATER LINE

Air Conditioning Supply Co., Cleveland, O.  
 American Brass Co., Waterbury, Conn.  
 Bishop Humidifier Co., Detroit, Mich.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Fisher Governor Co., Marshalltown, Ia.  
 Hays Mfg. Co., Erie, Pa.  
 Kleenaire Corp., Stevens Point, Wis.  
 ● Maid-O'-Mist, Inc., Chicago, Ill.  
 ● Monmouth Products Co., Cleveland, O.  
 Reichert Float & Mfg. Co., Toledo, O.  
 Sallada Mfg. Co., Minneapolis, Minn.  
 ● Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.  
 ● Skuttle Co., J. L., Detroit, Mich.  
 Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.  
 Turney Corp., Muskegon, Mich.  
 Weatherhead Co., Cleveland, O.

## FLANGES, BLOW PIPE

*See Fittings, Blow Pipe*

## FLASHINGS, ROOF, PATENTED

● American Rolling Mill Co., Middletown, Ohio.  
 Barrett Co., New York City (for brick and concrete)  
 Berger Mfg. Div. Republic Steel Co., Canton, Ohio.  
 Bridesburg Foundry Co., Philadelphia, Pa.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Cheney Co., Philadelphia.  
 ● Chicago Metal Mfg. Co., Chicago, Ill.  
 Downs-Smith Brass & Copper Co., New York City.  
 Eagle-Picher Lead Co., Cincinnati, O.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Figge Co., Chicago, Ill.  
 ● Hussey & Co., C. G., Pittsburgh, Pa.  
 Lamb & Ritchie Co., Cambridge, Mass.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ● Milcor Steel Co., Milwaukee, Wis.  
 New Delphos Mfg. Co., Delphos, O.  
 Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.  
 Providence Cornice Co., Providence, R. I.  
 Revere Copper and Brass Incorporated, New York City.  
 (Patented)  
 Robertson Co., H. H., Pittsburgh, Pa.  
 Rochester Lead Works, Inc., Rochester, N. Y.  
 Schoedinger, F. O., Columbus, O.  
 Seep-Lok Flashing Co., Inc., Yonkers, N. Y.  
 Simplex Manufacturing Co., Fond du Lac, Wis.  
 ThruBond Flashing Corp., New York City.  
 Van Noorden Co., E., Boston, Mass.  
 ● Williams-Wallace Co., San Francisco.  
 Willis Mfg. Co., Galesburg, Ill. (Copper).  
 York Corrugating Co., York, Pa.

## FLASHINGS, THROUGH-WALL, PATENTED

American Brass Co., Waterbury, Conn. (Copper).  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Cheney Co., Philadelphia, Pa. (Copper).  
 Majestic Flashing Company, Baltimore.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 ThruBond Flashing Corp., New York City.  
 Willis Mfg. Co., Galesburg, Ill. (Galvanized & copper).

## FLASHINGS, WALL, PATENTED

Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.  
 Cheney Co., Philadelphia, Pa.  
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
 Majestic Flashing Company, Baltimore.  
 ● Milcor Steel Co., Milwaukee, Wis.  
 New Delphos Mfg. Co., Delphos, O.  
 Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.  
 Providence Cornice Co., Providence, R. I.  
 St. Paul Corrugating Co., St. Paul, Minn.  
 Schoedinger, F. O., Co., Columbus, O.

Willis Mfg. Co., Galesburg, Ill.  
 York Corrugating Co., York, Pa.

## FLUE GAS ANALYZERS

*See Analyzers, Flue Gas*

## FLUX, SOLDERING

Allen Co., L. B., Chicago (Aluminum, Copper, Galv. Iron, Stainless Steel)  
 Alumaweld Co. of America, Chicago, Ill. (Aluminum)  
 American Chemical Paint Co., Ambler, Pa.  
 American Solder & Flux Co., Philadelphia, Pa.  
 Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.  
 Benson Co., Inc., Alex R., Hudson, N. Y. (Salts, Pastes).  
 Burnley Battery & Mfg. Co., North East, Pa. (Paste, Salts, Solution).  
 Diener Mfg. Co., Geo. W., Chicago, Ill.  
 Gardiner Metal Co., Chicago, Ill.  
 General Electric Co., Schenectady, N. Y.  
 Handy & Harmon, New York City.  
 Hercules Chemical Co., Inc., New York City.  
 Imperial Brass Mfg. Co., Chicago, Ill.  
 Kester Solder Co., Chicago, Ill.  
 Langsenkamp Co., F. H., Indianapolis, Ind. (Stainless Steel).  
 Lukens Metal Co., Thos. F., Philadelphia, Pa. (Copper, Galvanized Iron, Stainless Steel).  
 Milburn Co., Alexander, Baltimore, Md.  
 Pfanstiehl Chemical Co., Waukegan, Ill.  
 Potomac Mfg. Co., Philadelphia, Pa.  
 Revere Copper and Brass Incorporated, New York City.  
 ● Ruby Chemical Co., Columbus, O. (Liquid and Paste).  
 Sight Feed Generator Co., Richmond, Ind.  
 Torchweld Equipment Co., Chicago, Ill.

## FURNACE BLOWERS

*See Blowers, Furnace, Centrifugal*

## FURNACE-BURNER UNITS

*See Furnaces, Warm Air*

## FURNACE COVERING

*See Insulation, Furnace and Pipe*

## FURNACE LINING

*See Refractories*

## FURNACE PIPE

*See Pipe, Furnace*

## FURNACE PIPE FITTINGS AND ACCESSORIES

*See Fittings and Accessories, Furnace Pipe*

## FURNACE REGULATORS

*See Regulators, Furnace Draft, Mechanical and Motors, Damper, Furnace Draft, Electrical*

## FURNACE REPAIRS

*See Repairs, Stove and Furnace*

## FURNACES, SOLDERING

● American Gas Products Div. of American Radiator Co., New York City.  
 Bernz Co., Inc., Otto, Rochester, N. Y.  
 Burgess Soldering Furnace Co., Columbus, O. (Gasoline)  
 Clayton & Lambert Mfg. Co., Detroit, Mich.  
 Diener Mfg. Co., Geo. W., Chicago, Ill.  
 Electric Soldering Iron Co., Inc., Deep River, Conn.  
 Hones, Inc., Charles A., Baldwin, N. Y.  
 ● Johnson Gas Appliance Co., Cedar Rapids, Ia.  
 Liquefied Gas Appliance Co., Mars, Pa.  
 Odin Stove Mfg. Co., Erie, Pa.  
 Roper Corp., Geo. D., Rockford, Ill.  
 Turner Brass Works, Sycamore, Ill.  
 Wall Mfg. Supply Co., P., Pittsburgh, Pa.  
 Weiss & Co., H., New York City.

● Advertisement in this issue. See Index to Advertisers, page 168.



## FURNACES, WARM AIR, AIR CONDITIONING, COAL, CAST IRON

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Chandler Co., Cedar Rapids, Ia.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Faultless Heater Corp., Cleveland, O.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Fdy. Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Home Furnace Co., Holland, Mich.
- Ideal Furnace Co., Detroit, Mich.
- International Heater Co., Utica, N. Y.
- Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Liberty Foundry Co., St. Louis, Mo.
- Majestic Co., Huntington, Ind.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Premier Furnace Co., Dowagiac, Mich.
- Richardson & Boynton Co., New York City.
- Robinson Furnace Co., Chicago, Ill.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Spencer Heater Division, Williamsport, Pa.
- Thiele Furnace Co., Inc., Indianapolis, Ind.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

## FURNACES, WARM AIR, AIR CONDITIONING, COAL, STEEL

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Welding & Engineering Corp., Milwaukee, Wis.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Beck Engineering Combustion Kompany, St. Louis, Mo.
- Campbell Heating Co., Des Moines, Ia.
- Dall Steel Products Co., Lansing, Mich.
- Deshler Foundry & Machine Works, Deshler, O.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Faultless Heater Corp., Cleveland, O.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Fdy. Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Ideal Furnace Co., Detroit, Mich.
- International Heater Co., Utica, N. Y.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Lennox Furnace Co., Marshalltown, Ia.
- Liberty Foundry Co., St. Louis, Mo.
- Majestic Co., Huntington, Ind.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit, Mich.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Manufacturing & Engineering Co., Detroit, Mich.
- Naylor Corp., Air Cond. Div., Chicago, Ill.
- Nelson Corp., Herman, Moline, Ill.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Rudy Furnace Co., Dowagiac, Mich.
- Richardson & Boynton Co., New York City.
- Round Oak Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.

- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Spencer Heater Division, Williamsport, Pa.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Thiele Furnace Co., Inc., Indianapolis, Ind.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.

## FURNACES, WARM AIR, AIR CONDITIONING, GAS, CAST IRON

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- American Gas Products Div. of American Radiator Co., New York City.
- Beck Engineering Combustion Kompany, St. Louis, Mo.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Henry Furnace & Fdy. Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Ideal Furnace Co., Detroit, Mich.
- International Heater Co., Utica, N. Y.
- Majestic Co., Huntington, Ind.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Premier Furnace Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- Sioux City Foundry and Boiler Company, Sioux City, Ia.
- Surface Combustion Corp., Toledo, O.
- Thatcher Furnace Co., Newark, N. J.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- XXth Century Heating & Ventilating Co., Akron, O.
- York Ice Machinery Corp., York, Pa.

## FURNACES, WARM AIR, AIR CONDITIONING, GAS, STEEL

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

- Airtemp Div. of Chrysler Corp., Dayton, O.
- Aladdin Heating Corp., Oakland, Cal.
- American Gas Products Div. of American Radiator Co., New York City.
- Auburn Burner Co., Auburn, Ind.
- Bard Mfg. Co., Bryan, O.
- Beck Engineering Combustion Kompany, St. Louis, Mo.
- Bryant Corp., C. L., Cleveland, O.
- Campbell Heating Company, Des Moines, Ia.
- Carrier Corp., Syracuse, N. Y.
- Corozone Air Conditioning Corp., The, Cleveland, O.
- Dall Steel Products Co., Lansing, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, O.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Gasconaire, Inc., Detroit, Mich.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Ideal Furnace Co., Detroit, Mich.
- Jackson & Church Co., Saginaw, Mich.
- Johnston Gas Furnace Corp., North Hollywood, Cal.
- Joliet Heating Corp., Joliet, Ill.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
- Lennox Furnace Co., Marshalltown, Ia.
- Majestic Co., Huntington, Ind.
- May-Fiebeger Co., Newark, O.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit, Mich.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Manufacturing & Eng. Co., Detroit, Mich.
- Nelson Corp., Herman, Moline, Ill.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Perfection Stove Co., Cleveland, O.
- Pernot & Rich, Inc., Los Angeles, Cal.
- Reznor Mfg. Co., Mercer, Pa.
- Reif-Rexoil, Inc., Buffalo, N. Y.
- Royal Air Conditioning Equipment, Compton, Cal.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Star Radiator Co., Los Angeles, Cal.
- Surface Combustion Corp., Toledo, O.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit, Mich.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- XXth Century Heating & Ventilating Co., Akron, O.

• Advertisement in this issue. See Index to Advertisers, page 168.

## FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON—BURNER FURNISHED

(Complete matched, oil-burning furnace (with burner) fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Excelsior Steel Furnace Co., Chicago.
- Forest City Foundries Co., Cleveland.
- General Electric Co., Schenectady, N. Y.
- Harvey-Whipple, Inc., Springfield, Mass.
- Home Furnace Co., Holland, Mich.
- Keith Furnace Co., Des Moines, Ia.
- Majestic Co., Huntington, Ind.
- Montag Stove & Furnace Works, Portland, Ore.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Syncro-Flame Burner Corporation, Willimantic, Conn.
- Thatcher Furnace Co., Newark, N. J.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Westwick & Son, Inc., John, Galena, Ill.

## FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL—BURNER FURNISHED

(Complete matched, oil-burning furnace (with burner) fan, filter and humidifier unit)

- Airtemp Div. of Chrysler Corp., Dayton, Ohio.
- American Air Conditioning Corp., Sebastopol, Cal.
- American Furnace Co., St. Louis.
- American Furnace & Foundry Co., Milan, Mich.
- Auburn Burner Co., Auburn, Ind.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Bard Mfg. Co., Bryan, Ohio.
- Beck Engineering Combustion Kompany, St. Louis.
- Campbell Heating Co., Des Moines, Ia.
- Calesco Corporation, Lynn, Mass.
- Carrier Corp., Syracuse, N. Y.
- Century Engineering Corporation, Cedar Rapids, Iowa.
- Cleveland Steel Products Corp., Toridheet Div., Cleveland.
- Corozone Air Conditioning Corp., The, Cleveland.
- Dall Steel Products Co., Lansing, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, Ohio.
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Electrol Incorporated, Clifton, N. J.
- Evans Corp., George, Moline, Ill.
- Fluid Heat Div., Anchor Post Fence Co., Baltimore.
- Forest City Foundries Co., Cleveland.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gehri Co., Tacoma, Wash.
- General Electric Co., Schenectady, N. Y.
- Gilbert & Barker Mfg. Co., Springfield, Mass.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harvey-Whipple, Inc., Springfield, Mass.
- Heil Co., Milwaukee.
- Hess Warming & Ventilating Co., Chicago.
- Hotentot Co., Inc., Omaha, Nebr.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Johnson Co., S. T., Oakland, Cal., and Philadelphia.
- Keith Furnace Co., Des Moines, Ia.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Lennox Furnace Co., Marshalltown, Iowa.
- Little Burner Co., Inc., H. C., San Rafael, Cal.
- Lochinvar Corp., Dearborn, Mich.
- McPherson Furnace & Supply Co., Portland, Ore.
- Majestic Co., Huntington, Ind.
- May-Flebeiger Co., Newark, Ohio.
- May Oil Burner Corp., Baltimore, Md.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Eng. Co., Detroit.
- Naylor Corp., Air Cond. Div., Chicago.
- Nelson Company, Detroit.
- Nelson Corp., Herman, Moline, Ill.
- Perfection Stove Co., Cleveland.
- Petroleum Heat & Power Co., Stamford, Conn.
- Quaker Mfg. Co., Chicago.
- Relf-Rexoll, Inc., Buffalo, N. Y.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Scott-Newcomb, Inc., St. Louis.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Syncro-Flame Burner Corp., Willimantic, Conn.
- Thatcher Furnace Co., Newark, N. J.
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.
- Viking Mfg. Co., Akron, Ohio.
- Waterman-Waterbury Co., Minneapolis.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- York Ice Machinery Corp., York, Pa.
- York Oil Burner Company, Inc., York, Pa.

## FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON—NO BURNER FURNISHED

(Complete matched oil-burning furnace (without burner), fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Excelsior Steel Furnace Co., Chicago.
- Forest City Foundries Co., Cleveland.
- Hess-Snyder Co., Massillon, Ohio.
- Home Furnace Co., Holland, Mich.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Iowa.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Liberty Foundry Co., St. Louis.
- Majestic Co., Huntington, Ind.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- Premier Furnace Co., Dowagiac, Mich.
- Richardson & Boynton Co., New York City.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Thatcher Furnace Co., Newark, N. J.
- Thiele Furnace Co., Inc., Indianapolis, Ind.
- Westwick & Son, Inc., John, Galena, Ill.

## FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL—NO BURNER FURNISHED

(Complete matched oil-burning furnace (without burner), fan, filter and humidifier unit)

- American Air Conditioning Corp., Sebastopol, Cal.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Welding & Engineering Corp., Milwaukee.
- Armstrong Furnace Co., Columbus, Ohio.
- Atlas Heating & Ventilating Co., Ltd., San Francisco.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Bard Mfg. Co., Bryan, Ohio.
- Beck Engineering Combustion Kompany, St. Louis.
- Calesco Corp., Lynn, Mass.
- Campbell Heating Co., Des Moines, Iowa.
- Dall Steel Products Co., Lansing, Mich.
- Evans Corp., George, Moline, Ill.
- Farquhar Furnace Co., Wilmington, Ohio.
- Fitzgibbons Boiler Co., Inc., New York City.
- Forest City Foundries Co., Cleveland.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gehri Co., Tacoma, Wash.
- Glasby Manufacturing Co., Inc., N. P., Bloomfield, N. J.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Fdy. Co., Cleveland.
- Hess-Snyder Co., Massillon, Ohio.
- Hess Warming & Ventilating Co., Chicago.
- Hotentot Co., Inc., Omaha, Nebr.
- International Heater Co., Utica, N. Y.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Lennox Furnace Co., Marshalltown, Iowa.
- Liberty Foundry Co., St. Louis.
- Majestic Co., Huntington, Ind.
- May-Flebeiger Co., Newark, Ohio.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Eng. Co., Detroit.
- Nelson Company, Detroit.
- Relf-Rexoll, Inc., Buffalo, N. Y.
- Richardson & Boynton Co., New York City.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Thatcher Furnace Co., Newark, N. J.
- United States Radiator Corp., Detroit.
- Waterman-Waterbury Co., Minneapolis.

## FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON—STOKER FURNISHED

(Complete matched stoker-furnace (with stoker), fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Excelsior Steel Furnace Co., Chicago.
- Home Furnace Company, Holland, Mich.
- Keith Furnace Co., Des Moines, Ia.

• Advertisement in this issue. See Index to Advertisers, page 168.

- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Spencer Heater Division, Williamsport, Pa. (Gravity Stoker)
- Westwick & Son, Inc., John, Galena, Ill.

### FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL—STOKER FURNISHED

(Complete matched stoker-furnace (with stoker), fan, filter and humidifier unit)

- American Furnace Co., St. Louis.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Campbell Heating Co., Des Moines, Ia.
- Dall Steel Products Co., Lansing, Mich.
- Excelsior Steel Furnace Co., Chicago.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hess Warming & Ventilating Co., Chicago.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Meyer Furnace Co., Peoria, Ill.
- Nelson Company, Detroit.
- Nelson Corp., Herman, Moline, Ill.
- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Westwick & Son, Inc., John, Galena, Ill.

### FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON—NO STOKER FURNISHED

(Complete matched stoker-furnace (without stoker), fan, filter and humidifier unit)

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- American Furnace & Foundry Co., Milan, Mich.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Excelsior Steel Furnace Co., Chicago.
- Forest City Foundries Co., Cleveland.
- Hess-Snyder Co., Massillon, Ohio.
- Home Furnace Co., Holland, Mich.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- Richardson & Boynton Co., New York City.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Thatcher Furnace Co., Newark, N. J.
- Westwick & Son, Inc., John, Galena, Ill.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.

### FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL—NO STOKER FURNISHED

(Complete matched stoker-furnace (without stoker), fan, filter and humidifier unit)

- American Furnace Co., St. Louis.
- American Furnace & Foundry Co., Milan, Mich.
- American Welding & Engineering Corp., Milwaukee.
- Armstrong Furnace Co., Columbus, Ohio.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Campbell Heating Co., Des Moines, Ia.
- Dall Steel Products Co., Lansing, Mich.
- Excelsior Steel Furnace Co., Chicago.
- Fitzgibbons Boiler Co., Inc., New York City.
- Forest City Foundries Co., Cleveland.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Fdy. Co., Cleveland.
- Hess-Snyder Co., Massillon, Ohio.
- Hess Warming & Ventilating Co., Chicago.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Lennox Furnace Co., Marshalltown, Iowa.
- Majestic Co., Huntington, Ind.
- May-Flebeiger Co., Newark, Ohio.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- National Manufacturing & Engineering Co., Detroit.
- Nelson Company, Detroit.
- Nelson Corp., Herman, Moline, Ill.
- Premier Furnace Co., Dowagiac, Mich.
- Round Oak Co., Dowagiac, Mich.

- St. Louis Furnace Manufacturing Co., St. Louis, Mo.
- Thatcher Furnace Co., Newark, N. J.
- Thiele Furnace Co., Inc., Indianapolis, Ind.
- Waterman-Waterbury Co., Minneapolis.
- Westwick & Son, Inc., John, Galena, Ill.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Whiting Corporation, Harvey, Ill.

### FURNACES, WARM AIR, GRAVITY, FLOOR

(For suspension beneath floor)

- Aladdin Heating Corp., Oakland, Cal.
- American Gas Products Div. of American Radiator Co., New York City.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Armstrong Furnace Co., Columbus, O.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Coleman Lamp & Stove Co., Wichita, Kan.
- Heckler Bros., Pittsburgh, Pa. (Gas)
- Holley Heating & Mfg. Co., Pasadena, Cal.
- Kling Metal Co., Oklahoma City, Okla.
- Lennox Furnace Co., Marshalltown, Ia. (Gas)
- Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
- Miller Floor Furnace Co., Oakland, Cal.
- Monarch Heating Co., Los Angeles.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Gas)
- Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.
- Mueller Furnace Co., L. J., Milwaukee, Wis. (Gas)
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Reznor Mfg. Co., Mercer, Pa.
- Rock Island Stove Co., Rock Island, Ill.
- Royal Air Conditioning Equipment, Compton, Cal. (Gas)
- Rudy Furnace Co., Dowagiac, Mich.
- Surface Combustion Corp., Toledo, O. (Gas)

### FURNACES, WARM AIR, GRAVITY, COAL, CAST IRON

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Barry Furnace Co., Hamilton, O.
- Bergstrom Mfg. Corp., Neenah, Wis.
- Brillion Furnace Co., Brillion, Wis.
- Chandler Co., Cedar Rapids, Ia.
- Columbus Heating & Ventilating Co., Columbus, O.
- Danville Stove & Mfg. Co., Danville, Pa.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Emrich Co., Inc., Columbus, O.
- Enterprise Boiler & Tank Works, Inc., Chicago.
- Enterprise Foundry Co., Belleville, Ill.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Farris Furnace Co., Springfield, Ill.
- Faultless Heater Corp., Cleveland, O.
- Favorite Stove Co., Piqua, O.
- Floral City Co., Monroe, Mich.
- Floyd-Wells Co., Royersford, Pa.
- Foot Foundry Co., J. B., Fredericktown, O.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Fuller-Warren Co., Milwaukee, Wis.
- Germer Stove Co., Erie, Pa.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hallstead Iron Foundry, Hallstead, Pa.
- Harold Furnace Mfg. Co., Spokane, Wash.
- Hart & Crouse Co., Inc., Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky.
- Heckler Bros., Pittsburgh, Pa.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Home Furnace Co., Holland, Mich.
- Home Stove Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit, Mich.
- Independence Stove & Furnace Co., Independence, Mo.
- International Heater Co., Utica, N. Y.
- Iowa Foundry Co., Sioux City, Ia.
- Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
- Kansas City Furnace Co., Kansas City, Mo.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Klein Stove Co., Philadelphia, Pa.
- Liberty Foundry Co., St. Louis, Mo.
- McPherson Furnace & Supply Co., Portland, Ore.
- MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.



- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Miller Range & Furnace Co., Wm., Cincinnati, O.
- Montag Stove & Furnace Works, Portland, Ore.
- Moore Corp., Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Oakland Foundry Co., Belleville, Ill.
- Orbon Stove Co., Belleville, Ill.
- Peerless Foundry Co., Indianapolis, Ind.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Pittston Stove Co., Pittston, Pa.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Richardson & Boynton Co., New York City.
- Robinson Furnace Co., Chicago, Ill.
- Rock Island Stove Co., Rock Island, Ill.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Clair Foundry Corp., Centralia, Ill.
- St. Louis Furnace Mfg. Co., St. Louis, Mo.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Spencer Heater Division, Williamsport, Pa. (Magazine feed)
- Standard Foundry & Furnace Co., De Kalb, Ill.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Stanton Heater Co., Martins Ferry, O.
- Thatcher Furnace Co., Newark, N. J.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit, Mich.
- Washington Stove Works, Everett, Wash.
- Western Furnaces, Inc., Tacoma, Wash.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Westwick & Son, Inc., John, Galena, Ill.
- Williamson Heater Co., Cincinnati, O.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, COAL, STEEL

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- American Welding & Engineering Corp., Milwaukee, Wis.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Calesco Corporation, Lynn, Mass.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Dail Steel Products Co., Lansing, Mich.
- Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
- Deshler Foundry & Mach. Wks., Deshler, O.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Emrich Co., Inc., Columbus, O.
- Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Faultless Heater Corp., Cleveland, O.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Gascol Furnace Co., Pittsburgh (With gas burner)
- Gehri Co., Tacoma, Wash.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hart Mfg. Co., Louisville, Ky.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Home Stove Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit, Mich.
- International Heater Co., Utica, N. Y.
- Iowa Foundry Co., Sioux City, Ia.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Koons Furnace Co., Danville, Ill.
- Kruse & Dewenter Co., Indianapolis, Ind.
- Lee Heating Systems, Youngstown, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Liberty Foundry Co., St. Louis, Mo.
- Lookout Furnace Co., Chattanooga, Tenn.
- Majestic Co., Huntington, Ind.
- Majestic Furnace Co., Seattle, Wash.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.

- National Mfg. & Engineering Co., Detroit.
- Nugent Sons, Inc., Thos., New York City.
- Oakland Foundry Co., Belleville, Ill.
- Patten Co., J. V., Sycamore, Ill.
- Peerless Foundry Co., Indianapolis, Ind.
- Pennsylvania Engineering Works, New Castle, Pa.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Premier Furnace Co., Dowagiac, Mich.
- Ramey Mfg. Co., Columbus, O.
- Ribside Furnace Co., Wausau, Wis.
- Richardson & Boynton Co., New York City.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Rosebraugh Co., W. W. Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Thatcher Furnace Company, Newark, N. J.
- Thiele Furnace Co., Inc., Indianapolis, Ind.
- Thompson Mfg. Co., Denver, Colo.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Williamson Heater Co., Cincinnati, O.
- Wise Furnace Co., Akron, O.
- Woodward & Co., Thos. S., Rochester, N. Y.
- XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, GAS, CAST IRON (Complete with burner)

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Gas Products Div. of American Radiator Co., New York City.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Beck Engineering Combustion Company, St. Louis, Mo.
- Bryant Heater Co., Cleveland, O.
- Favorite Stove Co., Piqua, O.
- Forest City Foundries Co., Cleveland, O.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hart Mfg. Co., Louisville, Ky.
- Jackson Sheet Metal Works, Ogden, Utah. (Combination Iron and Steel)
- Johnson Gas Furnace Corp., North Hollywood, Cal.
- Kelsey Heating Co., Syracuse, N. Y.
- Marvelaire Corp., West Los Angeles, Cal.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Reznor Mfg. Co., Mercer, Pa.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Mfg. Co., St. Louis.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Ward Heater Co., Ltd., Los Angeles, Cal.
- Wise Furnace Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, GAS, STEEL (Complete with burner)

- Aladdin Heating Corp., Oakland, Cal.
- American Furnace Co., St. Louis, Mo.
- American Gas Products Div. of American Radiator Co., New York City.
- Armstrong Furnace Co., Columbus, O.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Beck Engineering Combustion Company, St. Louis.
- Bryant Corp., C. L., Cleveland, O.
- Burmaster Gas Furnace Mfg. Co., Omaha, Nebr. (Sheet Iron)
- Calkins & Pearce, Columbus, O.
- Cocking, Geo. J., Santa Ana, Cal.
- Coleman Lamp & Stove Company, Wichita, Kansas.
- Dail Steel Products Co., Lansing, Mich.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Electrogas Furnace & Mfg. Co., San Francisco, Cal.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gascol Furnace Co., Pittsburgh.
- Green Foundry & Furnace Wks., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Heckler Bros., Pittsburgh, Pa.
- Hess-Snyder Co., Massillon, O.
- Holley Heating & Mfg. Co., Pasadena, Cal.
- Independence Stove & Furnace Co., Independence, Mo.
- Jackson & Church Co., Saginaw, Mich.
- Johnston Gas Furnace Corp., North Hollywood, Cal.

• Advertisement in this issue. See Index to Advertisers, page 168.

- Lee Heating Systems, Youngstown, O.
- Lennox Furnace Co., Marshalltown, Ia.
- May-Fiebeger Co., Newark, Ohio.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Mfg. & Engineering Co., Detroit.
- Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Perfection Stove Co., Cleveland.
- Reznor Mfg. Co., Mercer, Pa.
- Royal Air Conditioning Equipment, Compton, Cal.
- Rudy Furnace Co., Dowagiac, Mich.
- Ryniker Sheet Metal Works, Inc., Billings, Mont.
- St. Louis Furnace Mfg. Co., St. Louis.
- Star Radiator Co., Los Angeles.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Surface Combustion Corp., Toledo, O.
- Thompson Mfg. Co., Denver, Colo.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit.
- Ward Heater Co., Ltd., Los Angeles, Cal.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- XXth Century Heating & Ventilating Co., Akron, O.

### FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON (No burner furnished)

- Airtherm Mfg. Co., St. Louis, Mo.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Cleveland, O.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hart & Crouse Co., Inc., Utica, N. Y.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, Ohio.
- Ideal Furnace Co., Detroit, Mich.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Mueller Furnace Co., L. J., Milwaukee.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Portland Stove Foundry Co., Portland, Me.
- Rudy Furnace Co., Dowagiac, Mich.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Thatcher Furnace Company, Newark, N. J.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.

### FURNACES, WARM AIR, GRAVITY, OIL, STEEL (No burner furnished)

- American Furnace Co., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- American Welding & Engineering Corp., Milwaukee.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Bard Manufacturing Co., Bryan, O.
- Beck Engineering Combustion Kompany, St. Louis.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Campbell Heating Co., Des Moines, Ia.
- Cary Mfg. Co., Waupaca, Wis.
- Dall Steel Products Co., Lansing, Mich.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Economy Baler Co., Ann Arbor, Mich.
- Enterprise Boiler & Tank Wks., Inc., Chicago, Ill.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gehri Co., Tacoma, Wash.
- Green Foundry & Furnace Wks., Des Moines, Iowa.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Hotentot Co., Inc., Omaha, Nebr.
- Ideal Furnace Co., Detroit, Mich.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.

- Kelsey Heating Co., Syracuse, N. Y.
- Koons Furnace Co., Danville, Ill.
- Kruse & Dewenter Co., Indianapolis, Ind.
- Lee Heating Systems, Youngstown, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Liberty Foundry Co., St. Louis, Mo.
- Lookout Furnace Co., Chattanooga, Tenn.
- May-Fiebeger Co., Newark, Ohio.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Detroit, Mich.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Manufacturing & Engineering Co., Detroit.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Peerless Foundry Co., Indianapolis, Ind.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Rock Island Stove Co., Rock Island, Ill.
- Rosebraugh Co., W. W., Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- St. Louis Furnace Mfg. Co., St. Louis.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Sioux City Foundry and Boiler Co., Sioux City, Iowa.
- Thatcher Furnace Co., Newark, N. J.
- Thiele Furnace Co., Indianapolis, Ind.
- Thompson Mfg. Co., Denver, Colo.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

### FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON (Complete with burner)

- American Furnace & Foundry Co., Milan, Mich.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Forest City Foundries Co., Cleveland, O.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Harvey-Whipple, Inc., Springfield, Mass.
- Ideal Furnace Co., Detroit, Mich.
- Keith Furnace Co., Des Moines, Ia.

### FURNACES, WARM AIR, GRAVITY, OIL, STEEL (Complete with burner)

- American Air Conditioning Corp., Sebastopol, Cal.
- American Furnace Co., St. Louis, Mo.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Beck Engineering Combustion Kompany, St. Louis.
- Calesco Corporation, Lynn, Mass.
- Cary Mfg. Co., Waupaca, Wis.
- Century Engineering Corp., Cedar Rapids, Iowa.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gasoroll Company, Genoa City, Wis.
- Gilbert & Barker Mfg. Co., Springfield, Mass.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harvey-Whipple, Inc., Springfield, Mass.
- Hess Warming & Ventilating Co., Chicago.
- Hotentot Co., Inc., Omaha, Nebr.
- Ingle Mfg. Co., San Diego, Cal.
- Jackson & Church Co., Saginaw, Mich.
- Johnston Gas Furnace Corp., North Hollywood, Cal.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Koons Furnace Co., Danville, Ill.
- Lee Heating Systems, Youngstown, O.
- Lennox Furnace Co., Marshalltown, Iowa.
- Little Burner Co., Inc., H. C., San Rafael, Cal.
- Lochinvar Corp., Dearborn, Mich.
- May-Fiebeger Co., Newark, Ohio.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- National Manufacturing & Engineering Co., Detroit.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
- Nu-Way Corp., Rock Island, Ill.
- Perfection Stove Co., Cleveland, O.
- Petroleum Heat & Power Co., Stamford, Conn.
- Quaker Mfg. Co., Chicago, Ill.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Wayne Oil Burner Corp., Fort Wayne, Ind.
- Wood Industries, Inc., Gar, Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.



## FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON (Stoker furnished)

- Anchor Stove & Range Co., New Albany, Ind.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Ia.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Majestic Co., Huntington, Ind.
- Meyer Furnace Co., Peoria, Ill.
- Rudy Furnace Co., Dowagiac, Mich.

## FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON (No stoker furnished)

- American Furnace & Foundry Co., Milan, Mich.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Chandler Co., Cedar Rapids, Iowa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Floral City Co., Monroe, Mich.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, Ohio.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Majestic Co., Huntington, Ind.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Sioux City Fdy. & Boiler Co., Sioux City, Ia.

## FURNACES, WARM AIR, GRAVITY, STOKER, STEEL (Stoker furnished)

- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Meyer Furnace Co., Peoria, Ill.
- Schwitzer-Cummins Co., Indianapolis, Ind.

## FURNACES, WARM AIR, GRAVITY, STOKER STEEL (No stoker furnished)

- American Welding & Engineering Corp., Milwaukee.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Floral City Co., Monroe, Mich.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, Ohio.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Jackson & Church Co., Saginaw, Mich.
- Keith Furnace Co., Des Moines, Ia.
- Lookout Furnace Co., Chattanooga, Tenn.
- Majestic Co., Huntington, Ind.
- May-Fiebeger Co., Newark, Ohio.
- Mayflower-Lewis Corp., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Manufacturing & Engineering Co., Detroit.
- Premier Furnace Co., Dowagiac, Mich.
- Round Oak Co., Dowagiac, Mich.
- St. Louis Furnace Mfg. Co., St. Louis.
- Waterman-Waterbury Co., Minneapolis, Minn.

## FURNACES, WARM AIR, HORIZONTAL

- Acme Heating & Ventilating Co., Chicago, Ill.
- American Foundry & Furnace Co., Bloomington, Ill.
- Columbus Heating & Ventilating Co., Columbus, O.
- Farquhar Furnace Co., Wilmington, Ohio.
- Floral City Co., Monroe, Mich.
- Gehri Co., Tacoma, Wash.
- Jackson & Church Co., Saginaw, Mich.
- Kruse & Dewenter Co., Indianapolis, Ind.
- MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.

- McPherson Furnace & Supply Co., Portland, Ore.
- Moncrief Furnace Co., Atlanta, Ga.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- New York Blower Co., Chicago, Ill.
- Rosebraugh Co., W. W., Salem, Ore.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Western Furnaces, Inc., Tacoma, Wash.
- XXth Century Heating & Ventilating Co., Akron, O.

## FURNACES, WARM AIR, PIPELESS, CAST IRON

- Agricola Furnace Co., Inc., Gadsden, Ala.
- Airtherm Mfg. Co., St. Louis.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Barry Furnace Co., Hamilton, O.
- Brillion Furnace Co., Brillion, Wis.
- Chandler Co., Cedar Rapids, Ia.
- Danville Stove & Mfg. Co., Danville, Pa.
- Detroit Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Edwards Furnace Co., Wellboro, Pa.
- Emrich Co., Inc., Columbus, O.
- Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
- Enterprise Foundry Co., Belleville, Ill.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Favorite Stove Co., Piqua, O.
- Floral City Co., Monroe, Mich.
- Floyd-Wells Co., Royersford, Pa.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Div. of American Radiator Co., Elyria, O.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harold Furnace Mfg. Co., Spokane, Wash.
- Hart & Crouse Co., Inc., Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky.
- Heckler Bros., Pittsburgh, Pa.
- Henry Furnace & Foundry Co., Cleveland, O.
- Home Furnace Co., Holland, Mich.
- Home Stove Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit, Mich.
- Independence Stove & Furnace Co., Independence, Mo.
- Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.
- Kansas City Furnace Co., Kansas City, Mo.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Liberty Foundry Co., St. Louis, Mo.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Moore Corp., Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Orbon Stove Co., Belleville, Ill.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Pittston Stove Co., Pittston, Pa.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Ravenna Furnace & Heating Co., Ravenna, O.
- Richardson & Boynton Co., New York City.
- Robinson Furnace Co., Chicago, Ill.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Clair Foundry Corp., Centralia, Ill.
- St. Louis Furnace Mfg. Co., St. Louis, Mo.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Standard Foundry & Furnace Co., DeKalb, Ill.
- Stiglitz Furnace & Foundry Co., Louisville, Ky.
- Thatcher Furnace Co., Newark, N. J.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit, Mich.
- Ward Heater Co., Ltd., Los Angeles, Cal.
- Washington Stove Works, Everett, Wash.
- Western Furnaces, Inc., Tacoma, Wash.
- Westwick & Son, Inc., John, Galena, Ill.
- Williamson Heater Co., Cincinnati, O.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

## FURNACES, WARM AIR, PIPELESS, STEEL

- Airtherm Mfg. Co., St. Louis, Mo.
- Aladdin Heating Corp., Oakland, Cal.
- American Furnace & Foundry Co., Milan, Mich.
- Armstrong Furnace Co., Columbus, O.
- Campbell Heating Co., Des Moines, Ia.
- Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
- Detroit Michigan Stove Co., Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.



- Dowagiac Steel Furnace Co., Dowagiac, Mich.  
 Electrogas Furnace & Mfg. Co., San Francisco, Cal.  
 Enterprise Boiler & Tank Works, Inc., Chicago, Ill.  
 Floral City Co., Monroe, Mich.  
 Hart Mfg. Co., Louisville, Ky.  
 ●Henry Furnace & Foundry Co., Cleveland, O.  
 ●Hess Warming & Ventilating Co., Chicago, Ill.  
 Home Stove Co., Indianapolis, Ind.  
 Ideal Furnace Co., Detroit, Mich.  
 Ingle Mfg. Co., San Diego, Cal.  
 International Heater Co., Utica, N. Y.  
 Keith Furnace Co., Des Moines, Ia.  
 Kelsey Heating Co., Syracuse, N. Y.  
 Klein Stove Co., Philadelphia, Pa.  
 Koons Furnace Co., Danville, Ill.  
 Kruse & Dewenter Co., Indianapolis, Ind.  
 Lennox Furnace Co., Marshalltown, Ia.  
 Liberty Foundry Co., St. Louis, Mo.  
 Majestic Furnace Co., Seattle, Wash.  
 May-Fiebeger Co., Newark, O.  
 ●Meyer Furnace Co., Peoria, Ill.  
 Montag Stove & Furnace Works, Portland, Ore.  
 Nugent Sons, Inc., Thos., New York City.  
 Orbon Stove Co., Belleville, Ill.  
 Payne Furnace & Supply Co., Beverly Hills, Cal.  
 ●Peerless Foundry Co., Indianapolis, Ind.  
 Pennsylvania Furnace & Iron Co., Warren, Pa.  
 Pittsburgh Furnace Parts Co., Pittsburgh, Pa.  
 Portland Stove Foundry Co., Portland, Me.  
 Roberts-Hamilton Co., Minneapolis, Minn.  
 Rosebraugh Co., W. W., Salem, Ore.  
 ●Round Oak Co., Dowagiac, Mich.  
 ●St. Louis Furnace Mfg. Co., St. Louis, Mo.  
 Schill Mfg. Co., Crestline, O.  
 Stanton Heater Co., Martins Ferry, O.  
 Stiglitz Furnace & Foundry Co., Louisville, Ky.  
 Thompson Mfg. Co., Denver, Colo.  
 ●Twentieth Century Heating & Ventilating Co., Akron, O.  
 Ward Heater Co., Ltd., Los Angeles, Cal.  
 ●Waterman-Waterbury Co., Minneapolis, Minn.  
 ●Wise Furnace Co., Akron, O.  
 ●XXth Century Heating & Ventilating Co., Akron, O.

### FURNACES, WARM AIR, WOOD BURNING, CAST IRON

- Floral City Co., Monroe, Mich.  
 International Heater Co., Utica, N. Y.  
 Lennox Furnace Co., Marshalltown, Ia.  
 ●Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Oakland Foundry Co., Belleville, Ill.  
 Portland Stove Foundry Co., Portland, Me.  
 Western Furnaces, Inc., Tacoma, Wash.

### FURNACES, WARM AIR, WOOD BURNING, STEEL

- American Welding & Engineering Corp., Milwaukee, Wis.  
 Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.  
 Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.  
 ●Hess Warming & Ventilating Co., Chicago, Ill.  
 Jackson & Church Co., Saginaw, Mich.  
 Lennox Furnace Co., Marshalltown, Ia.  
 McPherson Furnace & Supply Co., Portland, Ore.  
 ●Meyer Furnace Co., Peoria, Ill.  
 Schwab Furnace & Mfg. Co., Milwaukee, Wis.

### GAGES, DRAFT

- Bacharach Industrial Instrument Co., Pittsburgh, Pa.  
 Bailey Meter Co., Cleveland, O.  
 Bristol Co., Waterbury, Conn.  
 Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.  
 Cole-Sullivan Engineering Co., Minneapolis, Minn.  
 Detroit Air Meter Co., Detroit.  
 Dwyer Mfg. Co., F. W., Chicago, Ill.  
 Ellison Draft Gage Co., Chicago, Ill.  
 Foxboro Co., Foxboro, Mass.  
 ●Friez & Sons, Julien P., Baltimore, Md.  
 Hays Corp., Michigan City, Ind.  
 Hill Co., E. Vernon, Chicago, Ill.  
 Hotstream Heater Co., The, Cleveland, O.  
 Manning, Maxwell & Moore, Inc., Bridgeport, Conn.  
 Moeller Instrument Co., Brooklyn, N. Y.  
 Precision Thermometer & Instrument Co., Philadelphia, Pa.  
 Preferred Utilities Mfg. Corp., New York City.

### GLASS, WIRE, FOR SKYLIGHTS

- Atcheson Glass Co., T. J., Buffalo.

### GRILLES, HEATING AND VENTILATING

- Aircraft Mfg. Co., Dayton, O.  
 Air Control Products, Inc., Muskegon, Mich.  
 ●American Foundry & Furnace Co., Bloomington, Ill.  
 American Instrument Co., Silver Springs, Md. (Low velocity air diffusers)  
 American Warming & Ventilating Co., Toledo, O.  
 ●Auer Register Co., Cleveland, O.  
 Barber-Colman Company, Rockford, Ill.  
 Beckley Perforating Co., Garwood, N. J.  
 Best Register Co., Milwaukee, Wis.  
 Carrier Corp., Syracuse, N. Y.  
 Central Wire & Iron Works, Des Moines, Ia.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Chicago Perforating Co., Chicago, Ill.  
 Cincinnati Mfg. Co., Cincinnati, O.  
 Clay Equipment Corp., Cedar Falls, Ia.  
 Decatur Iron & Steel Co., Decatur, Ala.  
 Diamond Mfg. Co., Wyoming, Pa.  
 Eckenroth Register Co., San Francisco, Cal.  
 Erdle Perforating Co., Rochester, N. Y.  
 Falstrom Co., Passaic, N. J.  
 Gillian Mfg. Co., Ferndale, Mich.  
 Globe Machine & Stamping Co., Cleveland, O.  
 ●Harrington & King Perforating Co., Chicago, Ill.  
 ●Hart & Cooley Mfg. Co., Chicago, Ill.  
 Hendrick Mfg. Co., Carbondale, Pa.  
 ●Independent Register Co., Cleveland, O.  
 Johnson & Chapman Co., Chicago, Ill.  
 ●Lamneck Products, Inc., Columbus, O.  
 Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.  
 Metalace Corp., South Boston, Mass.  
 ●Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Mundt & Sons, Charles, Jersey City, N. J.  
 Newman Brothers, Inc., Cincinnati, O.  
 Payne Furnace & Supply Co., Beverly Hills, Cal.  
 ●Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.  
 Reliable Perforating Co., Chicago, Ill.  
 Roberts-Hamilton Co., Minneapolis, Minn.  
 ●Rock Island Register Co., Rock Island, Ill.  
 ●Trane Co., La Crosse, Wis.  
 ●Tuttle & Bailey, Inc., New Britain, Conn.  
 ●United States Register Co., Battle Creek, Mich.  
 ●Waterloo Register Co., Waterloo, Ia.  
 Western Wire & Iron Works, Inc., Chicago, Ill.  
 Wickwire Spencer Steel Co., New York City.

### GUARDS, SNOW

- Berger Brothers Co., Philadelphia, Pa.  
 Boyd & Co., Inc., Chas. P., Philadelphia.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Danzer Metal Works Co., The, Hagerstown, Md.  
 Downs-Smith Brass & Copper Co., New York City.  
 Folsom Snow Guard Co., Boston, Mass.  
 ●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)  
 ●Levow, David, New York City.  
 Maysteel Products, Inc., Mayville, Wis.  
 Royal-Apex Mfg. Corp., Brooklyn, N. Y. (Cast Iron)  
 Western Wire & Iron Works, Inc., Chicago, Ill.  
 Wickwire Spencer Steel Co., New York City.

### GUNS, SPRAY, METALS

- Metals Coating Co. of America, Philadelphia, Pa.  
 Turner Brass Works, Sycamore, Ill.

### GUNS, SPRAY, PAINT

- Binks Mfg. Co., Chicago, Ill.  
 De Vilbiss Co., Toledo, O.  
 Electric Sprayit Co., Milwaukee, Wis.  
 Imperial Brass Mfg. Co., Chicago, Ill.  
 Milburn Co., Alexander, Baltimore, Md.  
 Spray Engineering Co., Somerville, Mass.

### GUTTERS

*See Eaves Trough and Gutters*

### HARDWARE, FOR CABINETS AND CASINGS (Handles, name plates, etc.)

- American Cabinet Hardware Corp., Rockford, Ill. (Pulls, Knobs, Hinges, Catches, etc.)  
 American Insulator Corp., New Freedom, Pa.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Crowe Name Plate & Mfg. Co., Chicago.  
 Grammes, L. F., & Sons, Inc., Allentown, Pa.  
 National Lock Co., Rockford, Ill.

● Advertisement in this issue. See Index to Advertisers, page 168.

## HEAT TRANSFER SURFACE

See Coils, Cooling, Direct Expansion; Coils, Heating; Coils, Cooling Water

## HEATERS, CIRCULATING, CABINET TYPE

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Furnace Co., St. Louis, Mo. (Gas and Oil)
- American Gas Products Corp., New York City.
- American Radiator Co., New York City. (Coal and Wood)
- Ames Co., W. R., San Francisco.
- Auburn Burner Co., Auburn, Ind. (Oil)
- Continental Stove Corp., Ironton, O. (Gas)
- Corozone Air Conditioning Corp., Cleveland, O. (Gas and Oil)
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Estate Stove Co., Hamilton, O.
- Evans Products Co., Evanoh Heater Div., Detroit. (Oil)
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gilbert & Barker Mfg. Co., Springfield, Mass.
- Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
- Independence Stove & Furnace Co., Independence, Mo. (Gas or Coal)
- Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.
- Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Coal, Gas, Oil and Wood)
- Odin Stove Mfg. Co., Erie, Pa. (Kerosene)
- Orbon Stove Co., Belleville, Ill.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Patten Co., J. V., Sycamore, Ill. (Coal and Gas)
- Perfection Stove Co., Cleveland. (Oil)
- Pittston Stove Co., Pittston, Pa.
- Pernot & Rich, Inc., Los Angeles.
- Quaker Mfg. Co., Chicago, Ill. (Oil)
- Reznor Mfg. Co., Mercer, Pa.
- Silent Glow Oil Burner Corp., Hartford, Conn.
- Silent Sioux Oil Burner Corp., Orange City, Ia. (Oil)
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit. (Oil)
- Victor Oil Burner Mfg. Co., Hartford, Conn.

## HEATERS, SCHOOL ROOM

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- Barry Furnace Co., Hamilton, O.
- Brillion Furnace Co., Brillion, Wis.
- Campbell Heating Co., Des Moines, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Corozone Air Conditioning Corp., Cleveland, O.
- Daniels Mfg. Co., Inc., Sam, Hartwick, Vermont. (Wood)
- Danville Stove & Mfg. Co., Danville, Pa.
- Des Moines Steel Furnace Co., Des Moines, Ia. (Oil)
- Detroit Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Estate Stove Co., Hamilton, O.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Farris Furnace Co., Springfield, Ill.
- Floral City Co., Monroe, Mich.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Harold Furnace Mfg. Co., Spokane, Wash.
- Hart & Crouse Co., Inc., Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess-Snyder Co., Massillon, Ohio.
- Home Stove Co., Indianapolis, Ind.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Koons Furnace Co., Danville, Ill.
- Lennox Furnace Co., Marshalltown, Ia.
- Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- Meyer Furnace Co., Peoria, Ill.
- Moncrief Furnace Co., Atlanta, Ga.
- Moore Corp., Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Orbon Stove Co., Belleville, Ill.
- Patten Co., J. V., Sycamore, Ill.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Pittston Stove Co., Pittston, Pa.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Quaker Mfg. Co., Chicago.
- Rock Island Stove Co., Rock Island, Ill.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Clair Foundry Corp., Centralia, Ill.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Standard Foundry & Furnace Co., DeKalb, Ill.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Waterman-Waterbury Co., Minneapolis, Minn.

- Western Blower Co., Seattle, Wash.
- Williamson Heater Co., Cincinnati, O.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

## HEATING COILS

See Coils, Heating

## HOSE, METAL, FOR ELIMINATING COMPRESSOR VIBRATION

- American Brass Co., Waterbury, Conn.
- American Metal Hose Branch, American Brass Co., Waterbury, Conn.
- Chicago Metal Hose Corporation, Maywood, Ill.
- Eclipse Aviation Corp., East Orange, N. J.
- Seamlex Co., Long Island City, N. Y.
- Tite Flex Metal Hose Co., Newark, N. J.
- United Metal Hose Co., Inc., Long Island City, N. Y.

## HOUSINGS, BLOWER

Detroit Stamping Co., Detroit. (For centrifugal wheels)

## HUMIDIFIER FITTINGS

See Fittings, Humidifier, Water Line

## HUMIDIFIER VALVES

See Valves, Humidifier, Water Level

## HUMIDIFIERS, FURNACE, EVAPORATION, AUTOMATIC

- Agricola Furnace Co., Inc., Gadsden, Ala.
- Air Conditioning Supply Co., The, Cleveland, O.
- Air Controls, Inc., Cleveland, O.
- American Air Conditioning Co., Minneapolis, Minn.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- Automatic Humidifier Co., Cedar Falls, Ia.
- Bishop Humidifier Co., Detroit, Mich.
- Bryant Heater Co., Cleveland, O.
- Calesco Corporation, Lynn, Mass.
- Cary Mfg. Co., Waupaca, Wis.
- Chandler Co., Cedar Rapids, Ia.
- Clarm Mechanical Devices Co., Lima, O.
- Des Moines Steel Furnace Co., Des Moines, Ia.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Fox Furnace Div. of American Radiator Co., Elyria, Ohio.
- Gardner Manufacturing Co., Horicon, Wis.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Health-O-Mist Humidifier Mfg. Co., Columbus, Wis.
- Henry Furnace & Foundry Co., Cleveland, O.
- Home Furnace Co., Holland, Mich.
- Ideal Furnace Co., Detroit, Mich.
- Iowa Foundry Co., Sioux City, Ia.
- Johnson Gas Appliance Co., Cedar Rapids, Ia.
- Kleenaire Corp., Stevens Point, Wis.
- Kraker, Henry, Holland, Mich.
- Lennox Furnace Co., Marshalltown, Iowa.
- Little Burner Co., Inc., H. C., San Rafael, Cal.
- Maid-O-Mist, Inc., Chicago, Ill.
- Marshall Furnace Co., Marshall, Mich.
- Meyer Furnace Co., Peoria, Ill.
- Monmouth Products Co., Cleveland, O.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Nugent Sons, Inc., Thos., New York City.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Premier Furnace Co., Dowagiac, Mich.
- Richardson & Boynton Co., New York City.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Sallada Mfg. Co., Minneapolis, Minn.
- Security Stove & Mfg. Co., Kansas City, Mo.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Skuttle Co., J. L., Detroit, Mich.
- Somers, Inc., H. J., Detroit, Mich.
- Thatcher Furnace Co., Newark, N. J.
- Universal Blower Co., Birmingham, Mich.
- Van Osdel Mfg. Co., Bloomfield Hills, Mich.
- Viking Air Conditioning Corp., Cleveland, O.
- Western Blower Co., Seattle, Wash.
- Wisconsin Humidifier Co., Milwaukee, Wis.
- Wise Furnace Co., Akron, O.

## HUMIDIFIERS, FURNACE, SPRAY, AUTOMATIC

- American Foundry & Furnace Co., Bloomington, Ill.

● Advertisement in this issue. See Index to Advertisers, page 168.

Binks Mfg. Co., Chicago, Ill.  
 Bishop & Babcock Mfg. Co., Cleveland, O.  
 Brundage Co., Kalamazoo, Mich.  
 Bryant Corp., C. L., Cleveland, O.  
 Bryant Heater Co., Cleveland, O.  
 ● Fox Furnace Div. of American Radiator Co., Elyria, Ohio.  
 Handelan Washed Air Co., Minneapolis, Minn.  
 Marshall Furnace Co., Marshall, Mich.  
 ● Meyer Furnace Co., Peoria, Ill.  
 ● Mueller Furnace Co., L. J., Milwaukee, Wis.  
 Rega Mfg. Co., Rochester, N. Y.  
 ● Schwitzer-Cummins Company, Indianapolis, Ind.  
 Somers, Inc., H. J., Detroit, Mich.  
 Southworth Machine Co., Portland, Me.  
 Spray Engineering Co., Somerville, Mass.  
 Supreme Electric Products Corp., Rochester, N. Y.  
 Thatcher Furnace Co., Newark, N. J.  
 Thermal Units Mfg. Co., Meriden, Conn.  
 United American Bosch Corp., Springfield, Mass.  
 U. S. Air Conditioning Corp., Minneapolis, Minn.

## HUMIDISTATS

Automatic Products Co., Milwaukee, Wis.  
 Automatic Temperature Control, Inc., New York City.  
 Barber-Colman Co., Rockford, Ill.  
 Bristol Co., Waterbury, Conn.  
 ● Detroit Lubricator Co., Detroit, Mich.  
 ● Friez & Sons, Julien P., Baltimore. (Human hair)  
 H-B Instrument Co., Inc., Philadelphia, Pa.  
 Johnson Service Co., Milwaukee, Wis. (Hair, membrane, wood)  
 Johnson Tool Co., East Providence, R. I.  
 Mayflower-Lewis Corp., St. Paul, Minn. (Hygroscopic paper element)  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. (Human hair)  
 Penn Electric Switch Co., Goshen, Ind. (Parchment)  
 Perfex Corp., Milwaukee, Wis.  
 Spencer Thermostat Co., Attleboro, Mass.  
 Standard Engineering Works, Pawtucket, R. I.  
 Supreme Electric Products Corp., Rochester, N. Y.  
 Taylor Instrument Companies, Rochester, N. Y.

## HUMIDITY CONTROLS

*See Humidistats*

## HUMIDITY RECORDERS

*See Recorders, Humidity*

## HYGROMETERS

Bristol Co., Waterbury, Conn.  
 Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.  
 Fee and Stenwedel, Inc., Chicago.  
 ● Friez & Sons, Julien P., Baltimore.  
 G. M. Manufacturing Co., New York City.  
 Johnson Service Co., Milwaukee, Wis.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis.  
 Moeller Instrument Co., Richmond Hill, New York City.  
 Precision Thermometer and Instrument Co., Philadelphia.  
 Taylor Instrument Companies, Rochester, N. Y.

## INDICATORS, SOUND LEVEL

General Electric Co., Schenectady, N. Y.  
 Johns-Manville, New York City.

## INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.  
 Air-O-Cell Industries, Inc., Detroit.  
 Alfol Insulation Co., Inc., New York City. (Bright metal surface)  
 Alton Mineral Wool Insulation Co., Alton, Ill.  
 Aluminum Aircell Insulation Co., Detroit.  
 American Flange & Mfg. Co., Inc., New York City.  
 American Hair & Felt Co., Chicago.  
 Armstrong Cork Co., Lancaster, Pa. (Cork)  
 Baldwin-Hill Co., Trenton, N. J. (Rock wool)  
 Barrett Co., New York City. (Tar felt and rock wool)  
 Cabot, Inc., Samuel, Boston, Mass.  
 Carey Co., Philip, Cincinnati, O.  
 Cellufoam Corporation of New Jersey, Chicago.  
 Celotex Corp., Chicago, Ill.  
 Certain-teed Products Corp., New York City. (Rigid fibre)  
 Cork Import Corp., New York City. (Corkboard)  
 Cork Insulation Co., Inc., New York City. (Cork)  
 Cornell Wood Products Co., Chicago, Ill.  
 Crown Cork & Seal Co., Baltimore.

Doheny Co., John J., Belmont, Mass. (Blanket)  
 Eagle Picher Lead Co., Cincinnati, O. (Mineral wool)  
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.  
 Friedrich & Dimmock, New York City. (Glass wool)  
 General Insulating & Mfg. Co., St. Louis. (Blanket)  
 Hinde & Dauch Paper Co., Sandusky, O.  
 Insulite Co., Minneapolis, Minn.  
 Johns-Manville, New York City. (Rock wool, fibre board)  
 Johnston Tin Foil & Metal Co., St. Louis. (Foil, aluminum, tin, lead)  
 Keasbey & Mattison Co., Ambler, Pa. (Mineral wool)  
 Kimberly-Clark Corp., Chicago.  
 Ludowici-Celadon Co., Chicago, Ill.  
 Marblehead Lime Co., Chicago. (Rock wool)  
 Masonite Corp., Chicago, Ill. (Wood fibre)  
 Mineral Felt Co., Toledo, O.  
 Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)  
 Mundet Cork Corp., New York City. (Cork)  
 National Gypsum Co., Buffalo, N. Y.  
 Norristown Magnesite & Asbestos Co., Norristown, Pa.  
 Pacific Lumber Co., San Francisco, Cal. (Loose fill)  
 Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.  
 Plastergon Wall Board Co., Buffalo.  
 Refractory & Insulation Corp., New York City.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 Rock Wool Products Co., Inc., Wabash, Ind.  
 ● Ruberold Co., New York City. (Rock wool and reflective)  
 Russell Insulation Co., F. C., Cleveland, O.  
 Schundler & Co., Inc., F. E., Joliet, Ill.  
 Smidth & Co., F. L., New York City.  
 Smith & Kanzler, Inc., Elizabeth, N. J.  
 Specialty Converters, Inc., Chicago, Ill.  
 Sprayo-Flake Co., Chicago, Ill.  
 Standard Asbestos Mfg. Co., Chicago, Ill.  
 Standard Lime & Stone Co., Baltimore, Md.  
 Therminsol Corp. of America, Kalamazoo, Mich. (Bats, bulk, granulated)  
 Truscon Steel Co., Youngstown, O.  
 United Cork Companies, Kearny, N. J.  
 United States Gypsum Co., Chicago, Ill.  
 U. S. Mineral Wool Co., Chicago. (Rock wool)  
 Upson Co., Lockport, N. Y.  
 ● Wilson, Inc., Grant, Chicago, Ill.  
 Wilson & Co., Inc., Chicago, Ill. (Haircraft)  
 Wood Conversion Co., St. Paul, Minn.  
 Zonolite Co., Detroit. (Loose fill)

## INSULATION, DUCT, SOUND DEADENING

Aluminum Aircell Insulation Co., Detroit.  
 American Hair & Felt Co., Chicago, Ill.  
 Berry, Jr., F. E., & Co., Inc., Everett, Mass.  
 Burgess Battery Co., Chicago, Ill.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Carey Co., Philip, Cincinnati, O.  
 Cellufoam Corporation of New Jersey, Chicago.  
 Celotex Corp., Chicago, Ill.  
 Cork Import Corp., New York City. (Corkboard)  
 Cork Insulation Co., Inc., New York City. (Cork)  
 Crown Cork & Seal Co., Baltimore.  
 Doheny Co., John J., Belmont, Mass.  
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.  
 Felters Co., Inc., Boston, Mass.  
 Johns-Manville, New York City.  
 Keasbey & Mattison Co., Ambler, Pa. (Asbestos)  
 Kimberly-Clark Corp., Chicago.  
 Masonite Corporation, Chicago. (Wood fibre)  
 Maysteel Products, Inc., Mayville, Wis.  
 Mineral Felt Co., Toledo, O.  
 Mortell Co., J. W., Chicago, Ill. (Adhesive)  
 Nelson Mfg. Co., B. F., Minneapolis, Minn.  
 Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.  
 Presstite Engineering Co., St. Louis, Mo.  
 Russell Insulation Co., F. C., Cleveland, Ohio.  
 Schundler & Co., Inc., F. E., Joliet, Ill.  
 Smith & Kanzler, Inc., Elizabeth, N. J.  
 Sprayo-Flake Co., Chicago, Ill.  
 Therminsol Corp., Kalamazoo, Mich. (Block rock wool)  
 Western Felt Works, Chicago, Ill.  
 ● Wilson, Inc., Grant, Chicago, Ill.  
 Zonolite Co., Detroit.

## INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill.  
 Alfol Insulation Co., Inc., New York City. (Bright metal surface)  
 Aluminum Aircell Insulation Co., Detroit. (Asbestos)  
 American Flange & Mfg. Co., Inc., New York City.  
 American Hair & Felt Co., Chicago, Ill.  
 Armstrong Cork Co., Lancaster, Pa.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Carey Co., Philip, Cincinnati, O.  
 Cellufoam Corporation of New Jersey, Chicago.  
 Celotex Corp., Chicago, Ill.  
 Cork Import Corp., New York City. (Corkboard)  
 Cork Insulation Co., Inc., New York City. (Cork)  
 Crown Cork & Seal Co., Baltimore.

● Advertisement in this issue. See Index to Advertisers, page 168.



Eagle-Picher Lead Co., Cincinnati, O. (Mineral wool, block, blanket)  
 Ehret Magnesite Mfg. Co., Valley Forge, Pa.  
 General Insulating & Mfg. Co., St. Louis.  
 Ideal Commutator Dresser Co., Sycamore, Ill. (Asbestos cement lumber)  
 Insulite Co., Minneapolis, Minn.  
 Johns-Manville, New York City. (Rock cork)  
 Keasbey & Mattison Co., Ambler, Pa. (Asbestos air cell)  
 Kimberly-Clark Corp., Chicago.  
 Masonite Corp., Chicago, Ill. (Wood fibre)  
 Maysteel Products, Inc., Mayville, Wis.  
 Mineral Felt Co., Toledo, O.  
 Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)  
 Mundet Cork Corp., New York City. (Cork)  
 Owens-Corning Fiberglass Corp., Toledo, Ohio.  
 Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.  
 Presstite Engineering Co., St. Louis, Mo.  
 Refractory & Insulation Corp., New York City.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 Rock Wool Products Co., Inc., Wabash, Ind.  
 ●Ruberoid Co., New York City. (Asbestos cellular and laminated sheets)  
 Russell Insulation Co., F. C., Cleveland, Ohio.  
 ●Sall Mountain Co., Chicago, Ill.  
 Schundler & Co., Inc., F. E., Joliet, Ill.  
 Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.  
 Smith & Kanzler, Inc., Elizabeth, N. J.  
 Sprayo-Flake Co., Chicago, Ill.  
 Standard Asbestos Mfg. Co., Chicago, Ill.  
 Standard Fuel Engineering Co., Detroit. (Asbestos plastic and rock wool plastic)  
 Therminsul Corp. of America, Kalamazoo, Mich. (Block rock wool)  
 United Cork Companies, Kearney, N. J.  
 Western Felt Works, Chicago, Ill.  
 Wilson & Co., Inc., Chicago, Ill. (Hairbestos)  
 ●Wilson, Inc., Grant, Chicago, Ill.  
 Zonolite Co., Detroit, Mich.

## INSULATION, FURNACE

Alfol Insulation Co., Inc., New York City.  
 Aluminum Aircell Insulation Co., Detroit. (Asbestos)  
 Baldwin-Hill Co., Trenton, N. J. (Asbestos cement)  
 Carey Co., Philip, Lockland, Cincinnati, O.  
 General Insulating & Mfg. Co., St. Louis (Blanket)  
 Eagle Picher Lead Co., Cincinnati, O. (Blocks)  
 Ehret Magnesite Mfg. Co., Valley Forge, Pa.  
 Johns-Manville, New York City. (All types) (Asbestos and magnesite)  
 Keasbey & Mattison Co., Ambler, Pa.  
 Krehbiel, J. H., Chicago. (Asbestos, mineral wool)  
 Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)  
 Norristown Magnesite & Asbestos Co., Norristown, Pa.  
 Owens-Corning Fiberglass Corp., Toledo, O.  
 Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.  
 Preferred Utilities Mfg. Corp., New York City.  
 Rock Wool Products Co., Inc., Wabash, Ind. (Rock wool)  
 Refractory & Insulation Corp., New York City.  
 ●Ruberoid Co., New York City. (Asbestos and magnesite)  
 Schundler & Co., Inc., F. E., Joliet, Ill.  
 Smidth & Co., F. L., New York City.  
 Smith & Kanzler, Inc., Elizabeth, N. J.  
 Standard Asbestos Mfg. Co., Chicago, Ill.  
 Standard Lime & Stone Co., Baltimore, Md.  
 Therminsul Corp., Kalamazoo, Mich. (Block rock wool.)  
 ●Wilson, Inc., Grant, Chicago, Ill.  
 Zonolite Co., Detroit, Mich.

## LEADER STRAPS

*See Fittings and Accessories, Conductor*

## LIFTS, SKYLIGHT

California Cornice, Steel & Supply Corp., Los Angeles.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Dayton Greenhouse Mfg. Co., Dayton, O.  
 Hudson Equipment Corp., Minneapolis, Minn.  
 ●Levow, David, New York City. (Gearing)  
 Park City Cornice Works, Inc., Bridgeport, Conn.  
 Royal-Apex Mfg. Corp., Brooklyn, N. Y.  
 Schoedinger, F. O., Co., Columbus, O.  
 Van Noorden Co., E., Boston, Mass.  
 Weiss & Co., H., New York City.  
 Willis Mfg. Co., Galesburg, Ill.

## LININGS

*See Refractories*

## LOUVRES AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

Air Conditioning Products Co., Detroit, Mich.  
 Aire-Folie Fan & Blower Co., Detroit, Mich.

Airmaster Corp., Chicago, Ill.  
 ●Allen Corp., Detroit, Mich.  
 American Blower Corp., Detroit, Mich.  
 American Colair Corp., Jacksonville, Fla.  
 ●American Foundry & Furnace Co., Bloomington, Ill.  
 American Sheet Metal Works, New Orleans, La.  
 American Warming & Ventilating Co., Toledo, O.  
 Ames Co., W. R., San Francisco, Cal.  
 Andrews Lead Co., Inc., Long Island City, N. Y.  
 Arex Co., Chicago, Ill.  
 ●Autovent Fan & Blower Co., Chicago, Ill.  
 Barber-Colman Co., Rockford, Ill.  
 Bishop & Babcock Mfg. Co., Cleveland, O.  
 ●Buffalo Forge Co., Buffalo, N. Y.  
 Burt Mfg. Co., Akron, O.  
 Campbell Heating Co., E. K., Kansas City, Mo.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 ●Chicago Metal Mfg. Co., Chicago, Ill.  
 Clay Equipment Corp., Cedar Falls, Ia.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Decatur Iron & Steel Co., Decatur, Ala.  
 Diamond Mfg. Co., Wyoming, Pa.  
 Economy Electric Manufacturing Co., Cicero, Ill.  
 ●Elgo Shutter & Mfg. Co., Detroit, Mich.  
 Falstrom Co., Passaic, N. J.  
 General Regulator Corp., Chicago, Ill.  
 Gillian Mfg. Co., Ferndale, Mich.  
 Herrmann & Grace Co., Brooklyn, N. Y.  
 Hirschman Co., Inc., W. F., Buffalo, N. Y.  
 International Engineering, Inc., Dayton, O.  
 Jacobs Co., B. & J., Cincinnati, O.  
 Johnson Fan & Blower Corp., Chicago, Ill.  
 Jordan & Co., Paul R., Indianapolis, Ind.  
 Kel-San Manufacturing Co., Dayton, O.  
 Kelvin-White Co., Boston, Mass.  
 Kirk & Blum Mfg. Co., Cincinnati, O.  
 Kisco Company, Inc., St. Louis, Mo.  
 Lamb & Ritchie Co., Cambridge, Mass.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 Maysteel Products, Inc., Mayville, Wis.  
 Meier Electric & Machine Co., Indianapolis, Ind.  
 Meyer Mfg. Co., Detroit, Mich.  
 ●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Mountain States Equipment Co., Denver, Colo.  
 Myers Electric Co., Pittsburgh, Pa.  
 Perkinson & Brown, Chicago, Ill.  
 Providence Cornice Co., Providence, R. I.  
 Richmond Fireproof Door Co., Richmond, Ind.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 Ryniker Sheet Metal Works, Inc., Billings, Mont.  
 Schoedinger Co., F. O., Columbus, O.  
 Tiffin Art Metal Co., Tiffin, O.  
 ●Tuttle & Bailey, Inc., New Britain, Conn.  
 ●United States Register Co., Battle Creek, Mich.  
 ●Utility Fan Corporation, Los Angeles, Cal.  
 Van Noorden Co., E., Boston, Mass.  
 Willis Mfg. Co., Galesburg, Ill.  
 York Corrugating Co., York, Pa.

## MACHINERY, REBUILT AND USED

●Interstate Machinery Co., Inc., Chicago, Ill.  
 Maplewood Machinery Co., Inc., Chicago, Ill.  
 ●Osborn Co., J. M. & L. A., Cleveland, O.

## MACHINES, BAR FOLDERS, HAND

●Niagara Machine & Tool Works, Buffalo.  
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, BAR FOLDERS, POWER

●Niagara Machine & Tool Works, Buffalo.  
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, BEADING, HAND

●Niagara Machine & Tool Works, Buffalo.  
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, BEADING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.  
 ●Niagara Machine & Tool Works, Buffalo.  
 Peck, Stow & Wilcox Co., Southington, Conn.  
 Quickwork Co., Chicago, Ill.  
 Yoder Company, Cleveland, O.

## MACHINES, BURRING, HAND

●Niagara Machine & Tool Works, Buffalo.  
 Peck, Stow & Wilcox Co., Southington, Conn.

● Advertisement in this issue. See Index to Advertisers, page 168.

### MACHINES, BURRING, POWER

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, COMBINATION, HAND (Beading, Burring, Turning, Wiring, etc.)

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, COMBINATION, POWER (Beading, Burring, Turning, Wiring, etc.)

- Ingels Elbow Machine Corp., Chicago, Ill.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Quickwork Co., Chicago, Ill.
- Yoder Co., Cleveland, O.

### MACHINES, CRIMPING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Packham Crimper Co., Mechanicsburg, Ohio.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, CRIMPING, POWER

- Ingels Elbow Machine Corp., Chicago, Ill.
- New Albany Machine Mfg. Co., New Albany, Ind.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Yoder Company, Cleveland, O.

### MACHINES, ELBOW, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, ELBOW, POWER

- Ingels Elbow Machine Corp., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, FLANGING, HAND

- Binkley Mfg. Co., Warrenton, Mo.
- Niagara Machine & Tool Works, Buffalo.
- "Original" Metal Flanging Machine Works, Seattle, Wash.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Ward Machinery Co., Chicago, Ill.
- Weiss & Co., H., New York City.

### MACHINES, FLANGING, POWER

- Bittner Engineering Co., New York City.
- Callahan Can Machine Co., Inc., Brooklyn, N. Y.
- Cleveland Punch & Shear Works Co., Cleveland, O.
- Engineering Research Corporation, Washington, D. C.
- Niagara Machine & Tool Works, Buffalo.
- "Original" Metal Flanging Machine Works, Seattle, Wash.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Quickwork Co., Chicago, Ill.
- Whitney Metal Tool Co., Rockford, Ill.

### MACHINES, GROOVING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, GROOVING, POWER

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, NIBBLING, HAND

- National Machine Tool Co., Racine, Wis.

### MACHINES, NIBBLING, POWER

- Campbell, Andrew C., Div. of American Chain & Cable Co., Inc., Bridgeport, Conn.
- Savage Co., W. J., Knoxville, Tenn.

### MACHINES, PITTSBURGH LOCK FORMING

- Binkley Mfg. Co., Warrenton, Mo.
- Lockformer Co., Chicago, Ill.
- Maplewood Machinery Co., Inc., Chicago, Ill.
- Ward Machinery Co., Chicago, Ill.
- Whitney Metal Tool Co., Rockford, Ill.

### MACHINES, SEAMING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Weiss & Co., H., New York City.

### MACHINES, SEAMING, POWER

- Callahan Can Machine Co., Inc., Brooklyn, N. Y.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Quickwork Co., Chicago, Ill.
- Yoder Company, Cleveland, O.

### MACHINES, SETTING DOWN, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, SETTING DOWN, POWER

- Callahan Can Machine Co., Inc., Brooklyn, N. Y.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, SLIP ROLL FORMING, HAND

- Bertsch & Co., Cambridge City, Ind.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, SLIP ROLL FORMING, POWER

- Bertsch & Co., Cambridge City, Ind.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, SLITTING, HAND

- Bertsch & Co., Cambridge City, Ind.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Ward Machinery Co., Chicago, Ill.

### MACHINES, SLITTING, POWER

- Bertsch & Co., Cambridge City, Ind.
- Ingels Elbow Machine Corp., Chicago, Ill.
- Libert Machine Co., Green Bay, Wis. (Rotary)
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Quickwork Co., Chicago, Ill.
- Yoder Company, Cleveland, O.

### MACHINES, SQUARING, POWER

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### MACHINES, WIRING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

● Advertisement in this issue. See Index to Advertisers, page 168.

## MACHINES, WIRING, POWER

- Callahan Can Machine Co., Inc., Brooklyn, N. Y.
- Cleveland Punch & Shear Works Co., Cleveland, O.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Quickwork Co., Chicago, Ill.
- Yoder Company, Cleveland, O.

## MALLETS, METAL WORKING

- Bersted Co., Martin, Chicago, Ill. (Molded composition)
- Chicago Rawhide Mfg. Co., Chicago, Ill.
- Electric Materials Co., North East, Pa. (Copper)
- Fowler-Pem Co., Emeryville, Cal.
- Miller Rubber Co., Inc., Akron, O. (Composition)
- Niagara Machine & Tool Works, Buffalo. (Hickory)
- Peck, Stow & Wilcox Co., Southington, Conn. (Wood)
- Stanley Tools, New Britain, Conn. (Soft face hammers, hickory, rubber composition)

## METALS, PERFORATED, SHEET AND PLATE

- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Perforating Co., Chicago, Ill.
- Cross Engineering Co., Carbondale, Pa.
- Crucible Steel Co. of America, New York City.
- Diamond Mfg. Co., Wyoming, Pa.
- Erdle Perforating Co., Rochester, N. Y.
- Fairmont Aluminum Co., Fairmont, W. Va.
- Gillian Mfg. Co., Ferndale, Mich.
- Hall Metal Products Co., Long Beach, Cal.
- Harrington & King Perforating Co., Chicago, Ill.
- Hendrick Mfg. Co., Carbondale, Pa.
- International Nickel Co., Inc., New York City. (Monel and nickel)
- Johnston & Chapman Co., Chicago, Ill.
- Littleford Bros., Cincinnati, O.
- Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
- Martin Metal Mfg. Co., Wichita, Kan.
- Mundt & Sons, Charles, Jersey City, N. J.
- Nortmann-Duffke Co., Milwaukee, Wis.
- Reliable Perforating Co., Chicago, Ill.
- Revere Copper and Brass Incorporated, New York City.
- Standard Stamping & Perforating Co., Chicago, Ill.
- Western Wire & Iron Works, Inc., Chicago, Ill.
- Wickwire Spencer Steel Co., New York City.

## METAL SPRAY GUNS

*See Guns, Spray, Metals*

## METAL STAMPINGS

*See Stampings, Metal*

## METERS, AIR VELOCITY, DIRECT READING

- Detroit Air Meter Co., Detroit, Mich.
- Friez & Sons, Julien P., Baltimore, Md.
- Illinois Testing Laboratories, Inc., Chicago, Ill.

## MOTORS, DAMPER, DUCT, MODULATING OR PROPORTIONING

- Barber-Colman Co., Rockford, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Russell Electric Co., Chicago, Ill.
- White Manufacturing Co., St. Paul, Minn.

## MOTORS, DAMPER, DUCT, TWO-POSITION

- Automatic Products Co., Milwaukee, Wis.
- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- Friez & Sons, Julien P., Baltimore, Md.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Sampsel Time Control, Inc., Mendota, Ill.
- Sheer Co., H. M., Quincy, Ill.
- White Manufacturing Co., St. Paul, Minn.

## MOTORS, DAMPER, FURNACE DRAFT, ELECTRICAL

- Automatic Products Co., Milwaukee, Wis.
- Automatic Temperature Control, Inc., New York City.

- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago, Ill.
- Crise Elec. Mfg. Co., Mount Vernon, O.
- Detroit Lubricator Co., Detroit, Mich.
- Friez & Sons, Julien P., Baltimore, Md.
- General Controls Co., Glendale, Cal., and Cleveland, O.
- Gleason-Avery, Inc., Auburn, N. Y.
- Janette Mfg. Co., Chicago, Ill.
- Mercoide Corp., Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Perfex Corp., Milwaukee, Wis.
- Pioneer Heat Regulator Division, Master Electric Co., Dayton, O.
- Russell Electric Co., Chicago, Ill.
- Sheer Co., H. M., Quincy, Ill.
- White Mfg. Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

## MOTORS, ELECTRIC, FRACTIONAL H. P.

- Allis Co., Louis, Milwaukee, Wis.
- Baldor Electric Co., St. Louis, Mo.
- Barber-Colman Co., Rockford, Ill. (A. C.)
- Black & Decker Mfg. Co., Towson, Md.
- Bodine Electric Co., Chicago, Ill.
- Brown-Brockmeyer Co., Inc., Dayton, O.
- Burke Electric Co., Erie, Pa.
- Canatsey Electric Mfg. Co., Kansas City, Mo.
- Century Electric Co., St. Louis, Mo.
- Delco Products Division, General Motors Corp., Dayton, O.
- Diehl Mfg. Co., Elizabethport, N. J.
- Duro Co., Dayton, O.
- Emerson Electric Mfg. Co., St. Louis, Mo.
- General Electric Co., Schenectady, N. Y.
- Harnischfeger Corp., Milwaukee, Wis.
- Holtzer-Cabot Electric Co., Boston, Mass.
- Howell Electric Motors Co., Howell, Mich.
- Imperial Electric Co., Akron, O.
- Janette Mfg. Co., Chicago, Ill.
- Leland Electric Co., Dayton, O.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Master Electric Co., Dayton, O.
- Ohio Electric Mfg. Co., Cleveland, O.
- Peerless Electric Co., Warren, O.
- Robbins & Myers, Inc., Springfield, O.
- Reliance Electric & Engineering Co., Cleveland, O.
- Russell Electric Co., Chicago, Ill.
- Signal Electric Mfg. Co., Menominee, Mich.
- Speedway Mfg. Co., Cicero, Ill.
- Victor Electric Products, Inc., Cincinnati, O.
- Wagner Electric Corp., St. Louis, Mo.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- White-Rodgers Electric Co., St. Louis, Mo.

## MOTORS, ELECTRIC, 1 H. P. AND OVER

- Allis Co., Louis, Milwaukee, Wis.
- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Baldor Electric Co., St. Louis, Mo.
- Brown-Brockmeyer Co., Inc., Dayton, O.
- Burke Electric Co., Erie, Pa.
- Canatsey Electric Mfg. Co., Kansas City, Mo.
- Century Electric Co., St. Louis, Mo.
- Continental Electric Co., Inc., Newark, N. J.
- Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J.
- Delco Products Division, General Motors Corp., Dayton, O.
- Diehl Mfg. Co., Elizabethport, N. J.
- Duro Co., Dayton, O.
- Emerson Electric Mfg. Co., St. Louis, Mo.
- Fairbanks, Morse & Co., Chicago, Ill.
- General Electric Co., Schenectady, N. Y.
- Harnischfeger Corp., Milwaukee, Wis.
- Holtzer-Cabot Electric Co., Boston, Mass.
- Howell Electric Motors Co., Howell, Mich.
- Ideal Electric & Mfg. Co., Mansfield, O.
- Imperial Electric Co., Akron, O.
- Janette Mfg. Co., Chicago, Ill.
- Leland Electric Co., Dayton, O.
- Lincoln Electric Co., Cleveland, O.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Master Electric Co., Dayton, O.
- Peerless Electric Co., Warren, O.
- Robbins & Myers, Inc., Springfield, O.
- Star Electric Motor Co., Bloomfield, N. J.
- Wagner Electric Corp., St. Louis, Mo.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## MOULDING AND TRIM, ORNAMENTAL, for CABINETS and CASINGS

- Allmetal Weatherstrip Co., Chicago, Ill.
- Aluminum Co. of America, Pittsburgh, Pa.
- Brasco Mfg. Co., Harvey, Ill.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.

● Advertisement in this issue. See Index to Advertisers, page 168.



Empire Door Co., Inc., New York City.  
 Friedley-Voshardt Co., Chicago, Ill.  
 Herron-Zimmers Moulding Co., Detroit, Mich.  
 Ledkote Products Co., Long Island City, N. Y.  
 Mesker & Co., Geo. L., Evansville, Ind.  
 Miller & Doing, Inc., Brooklyn, N. Y.  
 Perrin Co., Edward C., Camden, N. J.  
 Pyramid Metals Company, Chicago, Ill.

### NAILS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 Townsend Co., New Brighton, Pa.

### NAILS, COPPER

American Steel & Wire Co., Chicago, Ill.  
 Angell Nail & Chaplet Co., Cleveland, O.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Columbia Steel Co., San Francisco, Cal.  
 Copperweld Steel Co., Glassport, Pa.  
 Downs-Smith Brass & Copper Co., New York City.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 ●Hussey & Co., C. G., Pittsburgh, Pa.  
 Maze Co., W. H., Peru, Ill.  
 Royal Metal Products Co., Brooklyn, N. Y.  
 Townsend Co., New Brighton, Pa.  
 Turner & Seymour Mfg. Co., Torrington, Conn.

### NAILS, HARDENED MASONRY

American Steel & Wire Co., Chicago, Ill.  
 Rawplug Co., Inc., New York City.  
 ●Ruberoide Co., New York City.  
 Townsend Co., New Brighton, Pa.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.

### NAILS, ROOFING

●American Rolling Mill Co., Middletown, O.  
 American Steel & Wire Co., Chicago, Ill.  
 Angell Nail & Chaplet Co., Cleveland, O.  
 Berger Mfg. Div. of Republic Steel Corp., Canton, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Columbia Steel Co., San Francisco, Cal.  
 Continental Steel Corp., Kokomo, Ind.  
 Colonial Alloys Co., Philadelphia, Pa.  
 Deniston Co., Chicago, Ill.  
 Dickson Weatherproof Nail Co., Evanston, Ill. (Lead headed)  
 Downs-Smith Brass & Copper Co., New York City.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Gulf States Steel Co., Birmingham, Ala.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 ●Hussey & Co., C. G., Pittsburgh, Pa.  
 Jones & Laughlin Steel Corp., Pittsburgh, Pa.  
 ●Malleable Iron Fittings Co., Branford, Conn.  
 Maze Co., W. H., Peru, Ill.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 National Lead Co., New York City.  
 New Delphos Mfg. Co., Delphos, O.  
 ●Republic Steel Corp., Cleveland, O.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 Townsend Co., New Brighton, Pa.  
 Turner & Seymour Mfg. Co., Torrington, Conn.  
 United States Steel Corp., Pittsburgh, Pa.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.  
 ●Youngstown Sheet & Tube Co., Youngstown, O.

### NAILS, SCREW, HARDENED

National Screw & Mfg. Co., Cleveland, O.  
 ●Parker-Kalon Corp., New York City.  
 ●Republic Steel Corp., Cleveland, O.  
 Townsend Co., New Brighton, Pa.

### NAILS, STAINLESS STEEL

Allegheny Ludlum Steel Corp., Brackenridge, Pa.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Crucible Steel Co. of America, New York City.  
 ●Republic Steel Corp., Cleveland, O.

Townsend Co., New Brighton, Pa.  
 Turner & Seymour Mfg. Co., Torrington, Conn.

### NAILS, ZINC COATED

American Steel & Wire Co., Chicago, Ill.  
 American Zinc Products Co., Greencastle, Ind.  
 Angell Nail & Chaplet Co., Cleveland, O.  
 Berger Mfg. Div. of Republic Steel Corp., Canton, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Columbia Steel Co., San Francisco, Cal.  
 Continental Steel Corp., Kokomo, Ind.  
 Gulf States Steel Co., Birmingham, Ala.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 Jones & Laughlin Steel Corp., Pittsburgh, Pa.  
 ●Malleable Iron Fittings Co., Branford, Conn.  
 Maze Co., W. H., Peru, Ill.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Galvanized)  
 Townsend Co., New Brighton, Pa.  
 United States Steel Corp., Pittsburgh, Pa.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.  
 ●Youngstown Sheet & Tube Co., Youngstown, O.

### NIGHT AIR FANS

*See Fans, Night Air Cooling*

### NOZZLES, SPRAY

Balloffett Dies & Nozzle Co., Inc., Guttenberg, N. J.  
 Betz Air Conditioning Corp., Kansas City, Mo.  
 Binks Mfg. Co., Chicago, Ill.  
 ●Buffalo Forge Co., Buffalo, N. Y.  
 Grinnell Co., Inc., Providence, R. I.  
 Harsch Co., Inc., H., Maplewood, N. J.  
 Howell Mfg. Co., Kansas City, Mo.  
 Hubbard Co., Minneapolis, Minn.  
 Johnson Tool Co., Inc., East Providence, R. I.  
 Marley Co., Kansas City, Kan.  
 Martocello & Co., Jos. A., Philadelphia, Pa.  
 Monarch Mfg. Works, Inc., Philadelphia, Pa.  
 Peterson Freezem Mfg. & Sales Co., Kansas City, Mo.  
 Preferred Utilities Mfg. Corp., New York City.  
 Rega Mfg. Co., Rochester, N. Y.  
 Spray Engineering Co., Somerville, Mass.  
 Spraying Systems Co., Chicago, Ill.  
 Sturtevant Co., B. F., Hyde Park, Boston, Mass.  
 Supreme Electric Products Corp., Rochester, N. Y.  
 York Ice Machinery Corp., York, Pa.

### OFFSETS, FURNACE PIPE

*See Fittings and Accessories, Furnace Pipe*

### OIL BURNERS

*See Burners, Oil*

### OZONIZERS

Chelsea Fan & Blower Co., Inc., New York City.  
 Corozone Air Conditioning Corp., Cleveland, O.  
 Electroaire Corp., Chicago, Ill.  
 Fresh'nd-Aire Co., Chicago, Ill.  
 Montgomery Bros., San Francisco, Cal.  
 Sealkote Corp., Chicago, Ill.  
 Triox Engineering Co., St. Louis, Mo.

### PAINT, ALUMINUM

Acme Refining Co., Cleveland, O.  
 Acorn Refining Co., Cleveland, O.  
 Aluminum Company of America, Pittsburgh, Pa.  
 Asphalt Products Co., Syracuse, N. Y.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Carter Paint Co., Liberty, Ind.  
 Connors Paint Mfg. Co., Wm., Troy, N. Y.  
 Continental Products Co., Euclid, O.  
 Cork Import Corp., New York City.  
 Debevoise Co., Brooklyn, N. Y.  
 Gerard Chemical Co., Elizabeth, N. J.  
 Glidden Co., Cleveland, O.  
 Hague & Co., Inc., Alfred, Brooklyn, N. Y.  
 Heath & Milligan Mfg. Co. Div. of Glidden Co., Chicago, Ill.  
 Hilo Varnish Corp., Brooklyn, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 168.

Horn Co., A. C., Long Island City, N. Y.  
 Inter-Coastal Paint Co., East St. Louis, Ill.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Koppers Co., Pittsburgh, Pa.  
 Lastik Products Co., Inc., Pittsburgh, Pa.  
 National Mfg. Corp., Tonawanda, N. Y.  
 O'Brien Varnish Co., South Bend, Ind.  
 Ohmlac Paint & Refining Co., Chicago, Ill.  
 ●Pyrolite Products Co., Cleveland, O.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.  
 Technical Coatings, Inc., New York City.  
 Thompson & Co., Pittsburgh, Pa.  
 Tropical Paint & Oil Co., Cleveland, O.  
 Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.  
 Wilhelm Co., A., Reading, Pa.

## PAINT, ASBESTOS

Acorn Refining Co., Cleveland, O.  
 Barber Co., Inc., Philadelphia, Pa.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Carey Co., Philip, Cincinnati, O.  
 Carter Paint Co., Liberty, Ind.  
 Connors Paint Mfg. Co., Wm., Troy, N. Y.  
 Flintkote Co., New York City.  
 Glidden Co., Cleveland, O.  
 Hague & Co., Inc., Alfred, Brooklyn, N. Y.  
 Heath & Milligan Mfg. Co. Div. of Glidden Co., Chicago, Ill.  
 Hetzel Roofing Products Co., Newark, N. J.  
 Horn Co., A. C., Long Island City, N. Y.  
 Inter-Coastal Paint Co., East St. Louis, Ill.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Lastik Products Co., Inc., Pittsburgh, Pa.  
 Metropolitan Refining Co., Long Island City, N. Y.  
 National Mfg. Corp., Tonawanda, N. Y.  
 Ohmlac Paint & Refining Co., Chicago, Ill.  
 ●Pyrolite Products Co., Cleveland, O.  
 ●Ruberoid Co., New York City.  
 Sauereisen Cements Co., Sharpsburg, Pa.  
 Tamms Silica Co., Chicago, Ill.  
 Thompson & Co., Pittsburgh, Pa.  
 Tropical Paint & Oil Co., Cleveland, O.  
 Wilhelm Co., A., Reading, Pa.  
 ●Wilson, Inc., Grant, Chicago, Ill.

## PAINT, CONCRETE, WATERPROOFING

Acme Refining Co., Cleveland, O.  
 Asphalt Products Co., Syracuse, N. Y.  
 Barber Co., Inc., Philadelphia, Pa.  
 Barrett Co., New York City.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Connors Paint Mfg. Co., Wm., Troy, N. Y.  
 Continental Products Co., Euclid, Ohio.  
 Debevoise Co., Brooklyn, N. Y.  
 Flintkote Co., New York City.  
 Gerard Chemical Co., Elizabeth, N. J.  
 Glidden Co., Cleveland, O.  
 Goodrich Co., B. F., Akron, O.  
 Hague & Co., Inc., Alfred, Brooklyn, N. Y.  
 Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.  
 Hilo Varnish Corp., Brooklyn, N. Y.  
 Horn Co., A. C., Long Island City, N. Y.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Koppers Co., Pittsburgh, Pa.  
 Lastik Products Co., Inc., Pittsburgh, Pa.  
 Metropolitan Refining Co., Long Island City, N. Y.  
 O'Brien Varnish Co., South Bend, Ind.  
 Ohmlac Paint & Refining Co., Chicago, Ill.  
 Pecora Paint Co., Philadelphia, Pa.  
 ●Pyrolite Products Co., Cleveland, O.  
 Reilly Tar & Chemical Corp., Indianapolis, Ind.  
 Robertson Co., H. H., Pittsburgh.  
 ●Ruberoid Co., New York City.  
 Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.  
 Tamms Silica Co., Chicago, Ill.  
 Thompson & Co., Pittsburgh, Pa.  
 Tropical Paint & Oil Co., Cleveland, O.  
 Truscon Laboratories, Detroit, Mich.  
 United States Gypsum Co., Chicago, Ill.  
 Wilhelm Co., A., Reading, Pa.

## PAINT, COPPER

American Coppercote, Inc., Brooklyn, N. Y.  
 Debevoise Co., Brooklyn, N. Y.

## PAINT, CRACKLE FINISH

Glidden Co., Cleveland, O.  
 Hague & Co., Inc., Alfred, Brooklyn, N. Y.

Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.  
 Hilo Varnish Corp., Brooklyn.  
 Inter-Coastal Paint Co., East St. Louis, Ill.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.  
 Tropical Paint & Oil Co., Cleveland, O.  
 Wattenamel Co., Summit, Ill.  
 Wilhelm Co., A., Reading, Pa.  
 Zapon-Brevolite Division, Atlas Powder Co., North Chicago, Ill.

## PAINT, HOT SURFACES

Acme Refining Co., Cleveland, O.  
 Acorn Refining Co., Cleveland, Ohio.  
 American Chemical Paint Co., Ambler, Pa.  
 Barrett Co., New York City.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Carey Co., Philip, Lockland, Cincinnati, O.  
 Carter Paint Co., Liberty, Ind.  
 Continental Products Co., Euclid, O.  
 Debevoise Co., Brooklyn, N. Y.  
 Gerard Chemical Co., Elizabeth, N. J.  
 Glidden Co., Cleveland, O.  
 Hague & Co., Inc., Alfred, Brooklyn, N. Y.  
 Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.  
 Hetzel Roofing Products Co., Newark, N. J.  
 Hilo Varnish Corp., Brooklyn.  
 Horn Co., A. C., Long Island City, N. Y.  
 Iowa Paint Mfg. Co., Des Moines, Ia.  
 Laclede-Christy Clay Products Co., St. Louis, Mo.  
 Lastik Products Co., Inc., Pittsburgh.  
 Metropolitan Refining Co., Long Island City, N. Y.  
 National Mfg. Corp., Tonawanda, N. Y.  
 O'Brien Varnish Co., South Bend, Ind.  
 Ohmlac Paint & Refining Co., Chicago, Ill.  
 ●Pyrolite Products Co., Cleveland, O.  
 Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.  
 Sauereisen Cements Co., Sharpsburg, Pa.  
 Technical Coatings, Inc., New York City.  
 Thompson & Co., Pittsburgh, Pa.  
 Tropical Paint & Oil Co., Cleveland, O.  
 ●Walsh Refractories Corp., St. Louis, Mo.  
 Westinghouse Electric & Manufacturing Co., East Pittsburgh.  
 Wilhelm Co., A., Reading, Pa.

## PAINT, ROOFING

Acme Refining Co., Cleveland, O.  
 Asphalt Products Co., Syracuse, N. Y.  
 Barber Co., Inc., Philadelphia, Pa. (Asphalt)  
 Barrett Co., New York City. (Pitch)  
 Bird & Son, Inc., East Walpole, Mass.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Calbar Paint & Varnish Co., Philadelphia, Pa.  
 Carey Co., Philip, Lockland, Cincinnati, O.  
 Carter Paint Co., Liberty, Ind.  
 Certain-teed Products Corp., New York City.  
 Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian)  
 Continental Products Co., Euclid, O. (All kinds)  
 Debevoise Co., Brooklyn, N. Y.  
 Glidden Co., Cleveland, O.  
 Heath & Milligan Mfg. Co., Division of Glidden Co., Chicago, Ill. (All kinds)  
 Horn Co., A. C., Long Island City, N. Y.  
 Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)  
 Koppers Co., Pittsburgh. (Bituminous)  
 Lastik Products Co., Inc., Pittsburgh, Pa. (Asphalt, Tar)  
 Ohmlac Paint & Refining Co., Chicago, Ill. (Asphalt)  
 Pecora Paint Co., Philadelphia, Pa.  
 ●Pyrolite Products Co., Cleveland, O. (Asbestos, Asphalt and Tar)  
 Reilly Tar & Chemical Corp., Indianapolis, Ind.  
 Robertson Co., H. H., Pittsburgh.  
 ●Ruberoid Co., New York City. (Asphalt and Tar)  
 Rutland Fire Clay Co., Rutland, Vt. (Asphalt)  
 Thompson & Co., Pittsburgh, Pa.  
 Wilhelm Co., A., Reading, Pa.

## PAINT SPRAY GUNS

See Guns, Spray, Paint

## PAPER, ASBESTOS

Carey Co., Philip, Lockland, Cincinnati, O.  
 Ehret Magnesite Mfg. Co., Valley Forge, Pa.  
 Johns-Manville, New York City.  
 Keasbey & Mattison Co., Ambler, Pa.  
 Norristown Magnesite & Asbestos Co., Norristown, Pa.  
 Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.  
 ●Ruberoid Co., New York City.

●Advertisement in this issue. See Index to Advertisers, page 168.

- Sall Mountain Co., Chicago, Ill.
- Smith & Kanzler, Inc., Elizabeth, N. J.
- Standard Asbestos Mfg. Co., Chicago, Ill.
- Wilson, Inc., Grant, Chicago, Ill.

## PASTE, ASBESTOS PAPER

- Clark Stek-O Corp., Rochester, N. Y.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Keasbey & Mattison Co., Ambler, Pa.
- Norristown Magnesia & Asbestos Co., Norristown, Pa.
- Ruberoid Co., New York City.
- Rutland Fire Clay Co., Rutland, Vt.
- Sall Mountain Co., Chicago, Ill.
- Smith & Kanzler, Inc., Elizabeth, N. J.
- Standard Asbestos Mfg. Co., Chicago, Ill.
- Wilson, Inc., Grant, Chicago, Ill.

## PERFORATED METALS

*See Metals, Perforated, Sheet and Plate*

## PILLOW BLOCKS

*See Bearings, Pillow Block*

## PIPE, CONDUCTOR

- Ames Co., W. R., San Francisco, Cal.
- Barnes Metal Products Co., Chicago, Ill.
- Berger Bros. Co., Philadelphia, Pa.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Braden Mfg. Co., Terre Haute, Ind.
- Budke Stamping Co., Canonsburg, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Danzer Metal Works Co., Hagerstown, Md.
- Decatur Iron & Steel Co., Decatur, Ala.
- Downs-Smith Brass & Copper Co., New York City.
- Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Martin Metal Mfg. Co., Wichita, Kan.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee, Wis.
- Miller & Doing, Inc., Brooklyn, N. Y.
- New Delphos Mfg. Co., Delphos, O.
- Newport Rolling Mill Co., Newport, Ky.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Providence Cornice Co., Providence, R. I.
- Reeves Steel & Mfg. Co., Dover, O.
- Revere Copper and Brass Incorporated, New York City.
- Rival Strap Corporation, New York City.
- Schoedinger Co., F. O., Columbus, O.
- Sheet Metal Products Co., Peoria, Ill.
- Southern States Iron Roofing Co., Savannah, Ga.
- Tiffin Art Metal Co., Tiffin, O.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wilder Manufacturing Co., Niles, O.
- Williams-Wallace Co., San Francisco.
- Woolwine Metal Products Co., Los Angeles, Cal.
- York Corrugating Co., York, Pa.

## PIPE, FURNACE

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
- Braden Mfg. Co., Terre Haute, Ind.
- Brex & Bieler, Inc., Brooklyn, N. Y.
- Budke Stamping Co., Canonsburg, Pa.
- Champion Furnace Pipe Co., Peoria, Ill.
- Chicago Furnace Supply Co., Chicago, Ill.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Cincinnati Stamping Co., Cincinnati, O.
- Corbman Bros., Inc., Philadelphia, Pa.
- Danzer Metal Works Co., Hagerstown, Md.
- Detroit Safety Furnace Pipe Co., Detroit, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Gray Metal Products, Inc., Rochester, N. Y.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Henry Furnace & Foundry Co., Cleveland, O.
- Home Furnace Co., Holland, Mich.
- Howes Co., S. M., Charlestown, Boston, Mass.
- International Heater Co., Utica, N. Y.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamneck Products, Inc., Columbus, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Lyon, Conklin & Co., Inc., Baltimore, Md.

- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Martin Metal Mfg. Co., Wichita, Kan.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee, Wis.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Payne Furnace & Supply Co., Beverly Hills, Cal.
- Peerless Foundry Co., Indianapolis, Ind.
- Portland Stove Foundry Co., Portland, Me.
- Providence Cornice Co., Providence, R. I.
- Reeves Steel & Mfg. Co., Dover, O.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Schecter Brothers Co., Philadelphia, Pa.
- Schoedinger Co., F. O., Columbus, O.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Tiffin Art Metal Co., Tiffin, O.
- United States Register Co., Battle Creek, Mich.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wilder Manufacturing Company, Niles, O.
- Williamson Heater Co., Cincinnati, O.
- Williams-Wallace Co., San Francisco.

## PIPE, SMOKE

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
- Airtherm Mfg. Co., St. Louis, Mo.
- Braden Mfg. Co., Terre Haute, Ind.
- Brex & Bieler, Inc., Brooklyn, N. Y.
- Budke Stamping Co., Canonsburg, Pa.
- Campbell Heating Co., Des Moines, Ia.
- Champion Furnace Pipe Co., Peoria, Ill.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Cincinnati Stamping Co., Cincinnati, O.
- Danzer Metal Works Co., Hagerstown, Md.
- Detroit Safety Furnace Pipe Co., Detroit, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Galva Heater Co., Galva, Ill. (Cast Iron)
- Green Foundry & Furnace Works, Des Moines, Ia.
- Henry Furnace & Foundry Co., Cleveland, O.
- Home Furnace Co., Holland, Mich.
- Howes Co., S. M., Charlestown, Boston, Mass.
- International Heater Co., Utica, N. Y.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamneck Products, Inc., Columbus, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- Martin Metal Mfg. Co., Wichita, Kan.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee, Wis.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Patten Co., J. V., Sycamore, Ill.
- Peerless Foundry Co., Indianapolis, Ind.
- Portland Stove Foundry Co., Portland, Me.
- Providence Cornice Co., Providence, R. I.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Reeves Steel & Mfg. Co., Dover, O.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Schecter Brothers Co., Philadelphia, Pa.
- Schoedinger Co., F. O., Columbus, O.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Sterling Foundry Co., Sterling, Ill. (Cast Iron)
- Ster-Na-Man Foundry Co., Springfield, Ill. (Cast Iron)
- Tiffin Art Metal Co., Tiffin, O.
- United States Register Co., Battle Creek, Mich.
- Waterloo Register Co., Waterloo, Ia. (Cast Iron)
- Wilder Manufacturing Company, Niles, O.
- Williamson Heater Co., Cincinnati, O.
- Williams-Wallace Co., San Francisco.
- Wise Furnace Co., Akron, O.

## PIPE & FITTINGS, GAS VENT AND FLUE

- Carnegie-Illinois Steel Corp., Pittsburgh.
- Condensation Engineering Corp., Chicago.
- Johns-Manville, New York City.
- Payne Furnace & Supply Co., Beverly Hills, Cal. (Insulated Aluminum)
- United States Steel Corp., Pittsburgh.
- Wilder Manufacturing Co., Niles, Ohio.
- Williams-Wallace Co., San Francisco.

## PIPE AND FITTINGS, SHEET METAL

*See Ducts and Fittings, Prefabricated*

● Advertisement in this issue. See Index to Advertisers, page 168.



## PLATE, BEARING, STUDDING SPACE

Adjustable Bearing Plate Co., St. Louis, Mo.

### PLATES, ALLOY

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.  
Aluminum Company of America, Pittsburgh, Pa. (Aluminum)  
American Brass Co., Waterbury, Conn. (All copper alloys)  
● American Rolling Mill Co., Middletown, O. (Stainless steel)  
Bethlehem Steel Co., Bethlehem, Pa.  
Colonial Alloys Co., Philadelphia.  
Crucible Steel Co. of America, New York City.  
Gulf States Steel Co., Birmingham, Ala. (Copper, Steel)  
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.  
Lukens Steel Co., Coatesville, Pa.  
● Republic Steel Corp., Cleveland, O. (Light gauge steel)  
Revere Copper and Brass Incorporated, New York City.  
● Youngstown Sheet & Tube Co., Youngstown, O.

### PLATES, STEEL

- American Rolling Mill Co., Middletown, O.  
Berger Mfg. Div. Republic Steel Co., Canton, Ohio.  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
Crucible Steel Co. of America, New York City.  
Decatur Iron & Steel Co., Decatur, Ala.  
Granite City Steel Co., Granite City, Ill.  
Gulf States Steel Co., Birmingham, Ala.  
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.  
Inland Steel Co., Chicago, Ill.  
International Steel Co., Evansville, Ind.  
Jones & Laughlin Steel Corp., Pittsburgh, Pa.  
Lukens Steel Co., Coatesville, Pa.  
Otis Steel Co., Cleveland, O.  
Ryerson & Son, Inc., Jos. T., Chicago, Ill.  
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
United States Steel Corp., Pittsburgh, Pa.  
Weirton Steel Co., Weirton, W. Va.  
Wood Steel Co., Alan, Conshohocken, Pa.  
● Youngstown Sheet & Tube Co., Youngstown, O.

### PLATES, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

### PREFABRICATED DUCTS

*See Ducts and Fittings, Prefabricated*

### PRESSES AND DIES

- Bertsch & Co., Cambridge City, Ind.  
Bliss Co., E. W., Toledo, O.  
Callahan Can Machine Co., Inc., Brooklyn, N. Y.  
Cleveland Punch & Shear Works Co., Cleveland, O.  
● Dreis & Krump Mfg. Co., Chicago, Ill.  
Grand Rapids Die & Tool Co., Grand Rapids, Mich.  
Henry & Wright Mfg. Co., Hartford, Conn.  
Marshalltown Mfg. Co., Marshalltown, Ia.  
McGee-Parry Machine Wks., Salt Lake City, Utah.  
Minster Machine Co., Minster, O.  
New Albany Machine Mfg. Co., New Albany, Ind.  
● Niagara Machine & Tool Works, Buffalo, N. Y.  
Peck, Stow & Wilcox Co., Southington, Conn.  
Perkins Machine Co., Warren, Mass.  
Schatz Mfg. Co., Poughkeepsie, N. Y.  
Service Machine Co., Elizabeth, N. J.  
Spun Steel Corp., Canton, O.  
Verson Allsteel Press Co., Chicago.  
Zeh & Hahnemann Co., Newark, N. J.

### PROTECTORS, DOWNSPOUT

*See Fittings and Accessories, Conductor*

### PSYCHROMETERS

- Bristol Co., Waterbury, Conn.  
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.  
● Friez & Sons, Julien P., Baltimore.  
G. M. Manufacturing Co., New York City.  
H-B Instrument Co., Inc., Philadelphia, Pa.  
Hill Co., Chicago, Ill.  
Moeller Instrument Co., Brooklyn, N. Y.  
Precision Thermometer & Instrument Co., Philadelphia, Pa.  
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.  
Taylor Instrument Companies, Rochester, N. Y.

## PULLEYS, FAN AND MOTOR

- Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
American Pulley Co., Philadelphia, Pa.  
Chicago Die Casting Co., Chicago, Ill.  
Congress Tool & Die Co., Detroit, Mich.  
Dayton Rubber Mfg. Co., Dayton, Ohio.  
Dick Co., Inc., R. & J., Passaic, N. J.  
Dodge Mfg. Corp., Mishawaka, Ind.  
Duro Metal Products Co., Chicago, Ill.  
Goldens' Fdry. & Mach. Co., Columbus, Ga.  
Horton Mfg. Co., Minneapolis, Minn.  
Jones Fdry. & Mach. Co., W. A., Chicago, Ill.  
● Lau Blower Co., Dayton, O.  
● Maurey Mfg. Corp., Chicago, Ill.  
McGee-Parry Machine Wks., Salt Lake City, Utah.  
Medart Co., St. Louis, Mo.  
Moloch Fdry. & Mach. Co., Kaukauna, Wis.  
Ohio Valley Pulley Works, Div. of Browning Mfg. Co., Inc., Maysville, Ky.  
Pyott Fdry. & Mach. Co., Chicago, Ill.  
Reynolds Mfg. Co., Grand Rapids, Mich.  
Rockwood Mfg. Co., Indianapolis, Ind.  
Smith, Inc., Winfield H., Springfield, N. Y.  
Spun Steel Corp., Canton, O.  
Steel and Tubes, Inc., Cleveland, O. (Stamping)  
Swift Mfg. Co., Detroit, Mich.  
Wood's Sons Co., T. B., Chambersburg, Pa.

### PULLEYS, FURNACE CHAIN

- Hart & Cooley Mfg. Co., Chicago, Ill.  
Medart Co., St. Louis.  
● Mueller Furnace Co., L. J., Milwaukee, Wis.  
Stover Mfg. & Engine Co., Freeport, Ill.  
● United States Register Co., Battle Creek, Mich.

### PUMPS, DEEP-WELL

- American-Marsh Pumps, Inc., Battle Creek, Mich.  
Caldwell, Farley M., Fort Wayne, Ind.  
● Chandler Co., Cedar Rapids, Ia.  
Crane Co., Chicago, Ill.  
Dayton Pump & Mfg. Co., Dayton, O.  
Decatur Pump Co., Decatur, Ill.  
Deming Co., Salem, O.  
Fairbanks, Morse & Co., Chicago, Ill.  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Hell Co., Milwaukee, Wis.  
Meier Electric & Machine Co., Indianapolis, Ind.  
Micro-Westco, Inc., Bettendorf, Ia.  
Myers & Bro. Co., F. E., Ashland, O.  
Pomona Pump Co., Pomona, Cal.  
Red Jacket Mfg. Co., Davenport, Ia.  
Roper Corp., Geo. D., Rockford, Ill.  
Union Steam Pump Co., Battle Creek, Mich.  
Uniflow Mfg. Co., Erie, Pa.  
United Motors Service, Detroit, Mich.  
Victor Equipment Co., Los Angeles, Cal.  
Worthington Pump & Machinery Corp., Harrison, N. J.

### PUMPS, SHALLOW-WELL

- American-Marsh Pumps, Inc., Battle Creek, Mich.  
● Chandler Co., Cedar Rapids, Ia.  
Crane Co., Chicago, Ill.  
Dayton Pump & Mfg. Co., Dayton, O.  
Decatur Pump Co., Decatur, Ill.  
Deming Co., Salem, O.  
Fairbanks, Morse & Co., Chicago, Ill.  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Hell Co., Milwaukee, Wis.  
Meier Electric & Machine Co., Indianapolis, Ind.  
Micro-Westco, Inc., Bettendorf, Ia.  
Morris Machine Works, Baldwinville, N. Y.  
Myers & Bro. Co., F. E., Ashland, Ohio.  
Pomona Pump Co., Pomona, Cal.  
Red Jacket Mfg. Co., Davenport, Ia.  
Roots-Connersville Blower Corp., Connersville, Ind.  
Roper Corp., Geo. D., Rockford, Ill.  
Uniflow Mfg. Co., Erie, Pa.  
United Motors Service, Detroit, Mich.  
Victor Equipment Co., Los Angeles, Cal.  
Viking Pump Co., Cedar Falls, Ia.  
Worthington Pump & Machinery Corp., Harrison, N. J.

### PUMPS, WATER CIRCULATING

- Aldrich Pump Co., Allentown, Pa.  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

● Advertisement in this issue. See Index to Advertisers, page 168.

American-Marsh Pumps, Inc., Battle Creek, Mich.  
 Bell & Gossett, Chicago, Ill.  
 Buffalo Pumps, Inc., Buffalo, N. Y.  
 Chicago Pump Co., Chicago, Ill.  
 Decatur Pump Co., Decatur, Ill.  
 Deming Co., Salem, O.  
 De Laval Steam Turbine Co., Trenton, N. J.  
 Economy Pumps, Inc., Chicago.  
 Fairbanks, Morse & Co., Chicago, Ill.  
 Frederick Iron & Steel Co., Frederick, Md.  
 Frick Co., Waynesboro, Pa.  
 Goulds Pumps, Inc., Seneca Falls, N. Y.  
 Ingersoll-Rand, New York City.  
 Janette Mfg. Co., Chicago, Ill.  
 Lecourtenay Co., Newark, N. J.  
 Lewis & Co., Inc., Chas. S., St. Louis, Mo.  
 Micro-Westco, Inc., Bettendorf, Ia.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Morris Machine Works, Baldwinsville, N. Y.  
 Myers & Bro. Co., F. E., Ashland, O.  
 Nash Engineering Co., South Norwalk, Conn.  
 National Steam Pump Co., Upper Sandusky, O.  
 Palmer Electric Co., Detroit, Mich.  
 Pernot & Rich, Inc., Los Angeles.  
 Quimby Pump Co., Inc., Newark, N. J.  
 Robbins & Myers, Inc., Springfield, Ohio.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Roots-Connersville Blower Corp., Connersville, Ind.  
 Roper Corp., Geo. D., Rockford, Ill.  
 ● Schwitzer-Cummins Co., Indianapolis, Ind.  
 Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.  
 Swaby Mfg. Co., Chicago, Ill.  
 Taco Heaters, Inc., New York City.  
 ● Trane Co., LaCrosse, Wis.  
 Trimount Rotary Power Co., East Dedham, Mass.  
 Uniflow Mfg. Co., Erie, Pa.  
 Union Steam Pump Co., Battle Creek, Mich.  
 ● Utility Fan Corporation, Los Angeles.  
 Victor Equipment Co., Los Angeles, Cal.  
 Viking Pump Co., Cedar Falls, Ia.  
 Watts Regulator Co., Lawrence, Mass.  
 Well Pump Co., Chicago, Ill.  
 Weinman Pump Co., Columbus, O.  
 Worthington Pump & Machinery Corp., Harrison, N. J.  
 Yeomans Bros. Co., Chicago, Ill.

### PUNCHES AND SHEARS COMBINED, LEVER OPERATED

Armstrong-Blum Mfg. Co., Chicago, Ill.  
 Beatty Machine & Mfg. Co., Hammond, Ind.  
 Bertsch & Co., Cambridge City, Ind.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Cleveland Punch & Shear Works Co., Cleveland, O.  
 Excelsior Tool & Machine Co., East St. Louis, Ill.  
 G.D.S. Machinery & Supply Co., New York City.  
 Heartley Machine & Tool Co., Toledo, O.  
 Hendley & Whittemore Co., Beloit, Wis.  
 Kidder Mfg. Co., Inc., J. F., Burlington, Vt.  
 National Machine Tool Co., Racine, Wis.  
 ● Niagara Machine & Tool Works, Buffalo, N. Y.  
 Peck, Stow & Wilcox Co., Southington, Conn.  
 Pels & Co., Inc., Henry, New York City.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Royersford Foundry & Machine Co., Royersford, Pa.  
 Schatz Mfg. Co., Poughkeepsie, N. Y.  
 Weiss & Co., H., New York City.

### PUNCHES, BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Clough, A. W., Meriden, Conn.  
 Excelsior Tool and Machine Co., East St. Louis, Ill.  
 Heartley Machine & Tool Co., Toledo, O.  
 Hendley & Whittemore Co., Beloit, Wis.  
 Kidder Mfg. Co., Inc., J. F., Burlington, Vt.  
 New Albany Machine Mfg. Co., New Albany, Ind.  
 ● Niagara Machine & Tool Works, Buffalo, N. Y.  
 Peck, Stow & Wilcox Co., Southington, Conn.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Schatz Mfg. Co., Poughkeepsie, N. Y.  
 Verson Allsteel Press Co., Chicago.  
 Weiss & Co., H., New York City.  
 ● Whitney Mfg. Co., W. A., Rockford, Ill.  
 ● Whitney Metal Tool Co., Rockford, Ill.  
 Wiedemann Machine Co., Philadelphia.

### PUNCHES, COMBINATION HAND AND BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Heartley Machine & Tool Co., Toledo, O.  
 Hendley & Whittemore Co., Beloit, Wis.  
 ● Niagara Machine & Tool Works, Buffalo, N. Y.

Peck, Stow & Wilcox Co., Southington, Conn.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Schatz Mfg. Co., Poughkeepsie, N. Y.  
 Weiss & Co., H., New York City.  
 ● Whitney Mfg. Co., W. A., Rockford, Ill.  
 ● Whitney Metal Tool Co., Rockford, Ill.

### PUNCHES, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.  
 Bertsch & Co., Cambridge City, Ind.  
 Bollaert, M., Oakland, Cal.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Cleveland Punch & Shear Works Co., Cleveland, O.  
 Clough, A. W., Meriden, Conn.  
 Heartley Machine & Tool Co., Toledo, O.  
 Hendley & Whittemore Co., Beloit, Wis.  
 Johnson, Inc., William, Newark, N. J.  
 Kidder Mfg. Co., Inc., J. F., Burlington, Vt.  
 ● Niagara Machine & Tool Works, Buffalo, N. Y.  
 ● Parker-Kalon Corp., New York City.  
 Peck, Stow & Wilcox Co., Southington, Conn.  
 Pels & Co., Inc., Henry, New York City.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Schatz Mfg. Co., Poughkeepsie, N. Y.  
 Service Machine Co., Elizabeth, N. J.  
 Weiss & Co., H., New York City.  
 ● Whitney Mfg. Co., W. A., Rockford, Ill.  
 ● Whitney Metal Tool Co., Rockford, Ill.  
 Wiedemann Machine Co., Philadelphia.

### PUNCHES, POWER

Beatty Machine & Mfg. Co., Hammond, Ind.  
 Bertsch & Co., Cambridge City, Ind.  
 Bliss Co., E. W., Toledo, O.  
 ● Buffalo Forge Co., Buffalo, N. Y.  
 Callahan Can Machine Co., Inc., Brooklyn, N. Y.  
 Cleveland Punch & Shear Works Co., Cleveland, O.  
 Excelsior Tool and Machine Co., East St. Louis, Ill.  
 Heartley Machine & Tool Co., Toledo, O.  
 Hendley & Whittemore Co., Beloit, Wis.  
 Henry & Wright Mfg. Co., Hartford, Conn.  
 New Albany Machine Mfg. Co., New Albany, Ind.  
 ● Niagara Machine & Tool Works, Buffalo, N. Y.  
 Peck, Stow & Wilcox Co., Southington, Conn.  
 Pels & Co., Inc., Henry, New York City.  
 Perkins Machine Co., Warren, Mass.  
 Rock River Machine Co., Inc., Janesville, Wis.  
 Royersford Foundry & Machine Co., Royersford, Pa.  
 Schatz Mfg. Co., Poughkeepsie, N. Y.  
 Service Machine Co., Elizabeth, N. J.  
 Swaine Mfg. Co., Fred J., St. Louis, Mo.  
 Verson Allsteel Press Co., Chicago.  
 Weiss & Co., H., New York City.  
 ● Whitney Metal Tool Co., Rockford, Ill.  
 Wiedemann Machine Co., Philadelphia.  
 Zeh & Hahnemann Co., Newark, N. J.

### QUADRANTS, DAMPER

● American Foundry & Furnace Co., Bloomington, Ill.  
 California Cornice, Steel and Supply Corp., Los Angeles, Cal.  
 Goese Mfg. Co., Milwaukee, Wis.  
 ● Hart & Cooley Mfg. Co., Chicago, Ill.  
 Jamar Co., Walker, Duluth, Minn.  
 ● K-B-Damper Control, Cincinnati, Ohio.  
 Littleford Bros., Cincinnati, O.  
 Northern Weatherstrip Co., Duluth, Minn.  
 Ohio Products Co., Cleveland, O.  
 ● Parker-Kalon Corp., New York City.  
 Schoedinger Co., F. O., Columbus, O.  
 Weiss & Co., H., New York City.  
 Young Regulator Co., Cleveland, O.

### RECORDERS, HUMIDITY

Bristol Co., Waterbury, Conn.  
 Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.  
 ● Friez & Sons, Julien P., Baltimore, Md.  
 G. M. Manufacturing Co., New York City.  
 H-B Instrument Co., Inc., Philadelphia, Pa.  
 Leeds & Northrup Co., Philadelphia, Pa.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Moeller Instrument Co., Richmond Hill, New York City.  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.  
 Taylor Instrument Companies, Rochester, N. Y.

### RECORDERS, TEMPERATURE

Balley Meter Co., Cleveland, O.  
 Bristol Co., Waterbury, Conn.

● Advertisement in this issue. See index to Advertisers, page 168.

- Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.
- Friez & Sons, Julien P., Baltimore, Md.
- G. M. Manufacturing Co., New York City.
- General Electric Co., Schenectady, N. Y.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Leeds & Northrup Co., Philadelphia, Pa.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Moeller Instrument Co., Richmond Hill, New York City.
- Practical Instrument Co., Chicago, Ill.
- Preferred Utilities Mfg. Corp., New York City.
- Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Taylor Instrument Companies, Rochester, N. Y.

## REFRACTORIES

- Chapman Clay Co., Zanesville, O.
- Chicago Fire Brick Co., Chicago, Ill.
- Cleveland Fire Brick Co., Cleveland, O.
- Johns-Manville, New York City. (Cement and monolithic)
- Keasbey & Mattison Co., Ambler, Pa.
- Krehbiel, J. H., Chicago, Ill.
- Laclede-Christy Clay Products Co., St. Louis, Mo. (Fire brick and high temperature mortars)
- Pilbrico Jointless Firebrick Co., Chicago. (Plastic fire brick for stokers and oil burners)
- Preferred Utilities Mfg. Corp., New York City.
- Pyrolite Products Co., Cleveland, O.
- Refractory & Insulation Corp., New York City.
- Rex Clay Products Co., Detroit, Mich.
- Schundler & Co., Inc., F. E., Joliet, Ill.
- Standard Fuel Engineering Co., Detroit, Mich.
- Walsh Refractories Corp., St. Louis, Mo.

## REGISTER SHIELDS

See Shields, Warm Air Register

## REFRIGERATING UNITS

See Compressors, Refrigerating

## REGISTERS, DIRECTIONAL FLOW

- Air Control Products, Inc., Muskegon, Mich.
- Auer Register Co., Cleveland, O.
- Barber-Colman Co., Rockford, Ill.
- Eckenroth Register Co., San Francisco, Cal.
- Eisey Metal Specialties Co., Detroit, Mich.
- Gillian Mfg. Co., Ferndale, Mich.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- Hendrick Mfg. Co., Carbondale, Pa.
- Independent Register Co., Cleveland, O.
- Middleton Mfg. Co., H. C., Minneapolis, Minn.
- National Fan & Blower Corp., Chicago, Ill.
- Register & Grille Mfg. Co., Brooklyn, N. Y.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Waterloo Register Co., Waterloo, Ia.

## REGISTERS, HEATING AND VENTILATING

- Air Control Products, Inc., Muskegon, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- Auer Register Co., Cleveland, O.
- Barber-Colman Co., Rockford, Ill.
- Bergstrom Mfg. Co., Neenah, Wis.
- Best Register Co., Milwaukee, Wis.
- Diamond Mfg. Co., Wyoming, Pa.
- Eckenroth Register Co., San Francisco, Cal.
- Gillian Mfg. Co., Ferndale, Mich.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- Hendrick Mfg. Co., Carbondale, Pa.
- Independent Register Co., Cleveland, O.
- Lamneck Products, Inc., Columbus, O.
- Maysteel Products, Inc., Mayville, Wis.
- Middleton Mfg. Co., H. C., Minneapolis, Minn.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Newman Brothers, Inc., Cincinnati, O.
- Pacific Gas Radiator Co., Los Angeles, Cal.
- Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Roberts-Hamilton Co., Minneapolis, Minn.
- Rock Island Register Co., Rock Island, Ill.
- Springman Metal Specialty Co., Detroit, Mich.
- Standard Stamping & Perforating Co., Chicago, Ill.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Waterloo Register Co., Waterloo, Ia.

## REGULATORS, DRAFT, SMOKE PIPE

- Bristol Co., Waterbury, Conn.
- Cleveland Steel Products Corp., Toridheet Div., Cleveland.

- Cole Draft Governor Sales Co., Chicago, Ill.
- Cole-Sullivan Engineering Co., Minneapolis, Minn.
- Field Mfg. Co., Chicago, Ill.
- Gold Seal Furnace Co., Minneapolis, Minn. (Automatic)
- Harvey-Whipple, Inc., Springfield, Mass.
- Hotstream Heater Co., Cleveland, O. (Automatic)
- James Regulator Co., Inc., Pottsville, Pa.
- Parker-Kalon Corp., New York City. (Dial damper—Jiffy type)
- Platt Products Corp., Lansing, Mich. (6 and 9-inch)
- Polk Mfg. Co., Madison, Wis.
- Preferred Utilities Mfg. Corp., New York City.
- Simplex Mfg. Co., Fond du Lac, Wis.
- Walker Mfg. & Sales Corp., St. Joseph, Mo.
- Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

## REGULATORS, FURNACE DRAFT, MECHANICAL

- Automatic Humidifier Co., Cedar Falls, Ia.
- Automatic Temperature Control, Inc., New York City.
- Barber-Colman Co., Rockford, Ill.
- Cole-Sullivan Engineering Co., Minneapolis, Minn.
- Gleason-Avery, Inc., Auburn, N. Y.
- Gold Seal Furnace Co., Minneapolis, Minn.
- Hart & Cooley Mfg. Co., Chicago, Ill.
- Hays Corp., Michigan City, Ind.
- Little Janitor Furnace Clock Co., New York City.
- Mercoild Corp., Chicago, Ill.
- Minneapolis Automatic Draft Regulator Co., Minneapolis, Minn.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Russell Electric Co., Chicago, Ill.
- Tem Products Co., Midland, Pa.
- Uni-Therm, Inc., Elyria, O.
- Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

## RELAYS, ELECTRICAL

- Advance Electric Co., Los Angeles, Cal.
- Allen-Bradley Co., Milwaukee, Wis.
- Automatic Switch Co., New York City.
- Automatic Temperature Control, Inc., New York City.
- Bender Warrick Corp., Birmingham, Mich.
- Benjamin Elec. Mfg. Co., Des Plaines, Ill.
- Clark Controller Co., Cleveland, O.
- Cook Electric Co., Chicago, Ill.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- Detroit Lubricator Co., Detroit, Mich.
- Dunn, Inc., Struthers, Philadelphia, Pa.
- Edison Electric Controls Div., Thos. A. Edison, Inc., West Orange, N. J.
- Electric Controller & Mfg. Co., Cleveland, O.
- Friez & Sons, Julien P., Baltimore, Md.
- General Controls Co., Glendale, Cal., and Cleveland, O.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Guardian Electric Mfg. Co., Chicago, Ill.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Hart Mfg. Co., Hartford, Conn.
- Industrial Engineering Corp., Evansville, Ind.
- McCorkle Co., D. H., Berkeley, Cal.
- Mercoild Corp., Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Monitor Controller Co., Baltimore, Md.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Precision Thermometer & Instrument Co., Philadelphia, Pa.
- Sheer Co., H. M., Quincy, Ill.
- Spencer Thermostat Co., Attleboro, Mass.
- Taylor Instrument Companies, Rochester, N. Y.
- Ward Leonard Electric Co., Mt. Vernon, N. Y.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Weston Electrical Instrument Corp., Newark, N. J.
- White-Rodgers Electric Co., St. Louis.
- Zenith Electric Co., Chicago, Ill.

## REPAIRS, STOVE AND FURNACE

- Adams Co., Dubuque, Ia.
- Associated Heater Parts Co., Chicago, Ill.
- Banner Repair Parts Co., Youngstown, O.
- Bardes Range & Foundry Co., E. H., Cincinnati, O.
- Brauer Supply Co., A. G., St. Louis, Mo.
- Capitol Furnace & Stove Repair Co., Indianapolis, Ind.
- Central Furnace & Stove Repair Co., St. Louis, Mo.
- Cincinnati Stamping Co., Cincinnati, O.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Detroit Michigan Stove Co., Detroit, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Faultless Heater Corp., Cleveland, O.
- Henry Furnace & Foundry Co., Cleveland, O.
- Keith Furnace Co., Des Moines, Ia.
- Marshall Furnace Co., Marshall, Mich.
- Metzner Stove Repair Co., Kansas City, Mo.
- Miller & Son, C. Arthur, Elmira, N. Y. (Furnace)

● Advertisement in this issue. See Index to Advertisers, page 168.



Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.  
 National Foundry & Furnace Co., Dayton, O.  
 ●Northwestern Stove Repair Co., Chicago, Ill.  
 ●Peerless Foundry Co., Indianapolis, Ind.  
 ●Peninsular Stove Co., Detroit, Mich.  
 Pittsburgh Furnace Parts Co., Pittsburgh, Pa.  
 ●Round Oak Co., Dowagiac, Mich.  
 Security Stove & Mfg. Co., Kansas City, Mo.  
 ●Shamblen Furnace Parts Co., Pittsburgh, Pa.  
 Standard Foundry & Furnace Co., De Kalb, Ill.  
 Stiglitz Furnace & Foundry Co., Louisville, Ky.  
 Wayne Pattern & Foundry Co., Fort Wayne, Ind.  
 Williamson Heater Co., Cincinnati, O.

## RIDGE ROLLS AND RIDGING

●American Rolling Mill Co., Middletown, O.  
 Ames Co., W. R., San Francisco, Cal.  
 Barnes Metal Products Co., Chicago, Ill.  
 ●Berger Bros. Co., Philadelphia, Pa.  
 Berger Mfg. Div. of Republic Steel Corp., Canton, O.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 ●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Decatur Iron & Steel Co., Decatur, Ala.  
 Downs-Smith Brass & Copper Co., New York City.  
 Edwards Mfg. Co., Inc., Cincinnati, O.  
 Gulf States Steel Co., Birmingham, Ala.  
 ●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)  
 Inland Steel Co., Chicago, Ill.  
 Klauer Mfg. Co., Dubuque, Ia.  
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
 Lamb & Ritchie Co., Cambridge, Mass.  
 ●Lyon, Conklin & Co., Inc., Baltimore, Md.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 New Delphos Mfg. Co., Delphos, O.  
 Newport Rolling Mill Co., Newport, Ky.  
 Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.  
 ●Osborn Co., J. M. & L. A., Cleveland, O.  
 Providence Cornice Co., Providence, R. I.  
 Reeves Steel & Mfg. Co., Dover, O.  
 ●Republic Steel Corp., Cleveland, O.  
 Ryniker Sheet Metal Works, Inc., Billings, Mont.  
 Schoedinger Co., F. O., Columbus, O.  
 Southbridge Roofing Co., Inc., Southbridge, Mass.  
 Southern States Iron Roofing Co., Savannah, Ga.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 Tiffin Art Metal Co., Tiffin, O.  
 Van Noorden Co., E., Boston, Mass.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Willis Mfg. Co., Galesburg, Ill.  
 ●Williams-Wallace Co., San Francisco, Cal.  
 Woolwine Metal Products Co., Los Angeles, Cal.  
 ●Youngstown Sheet & Tube Co., Youngstown, O.

## RIVETS, ALLOY

Allegheny Ludlum Steel Corp., Brackenridge, Pa.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Clark Bros. Bolt Co., Milldale, Conn.  
 Colonial Alloys Co., Philadelphia, Pa.  
 ●Republic Steel Corp., Cleveland, O. (Stainless steel and steel)  
 Townsend Co., New Brighton, Pa.

## RIVETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Bridgeport Screw Co., Bridgeport, Conn.  
 Chicago Rivet & Machine Co., Cicero, Ill.  
 Continental Screw Co., New Bedford, Mass.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 Townsend Co., New Brighton, Pa.

## RIVETS, BRASS, COPPER AND IRON

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 ●Blake & Johnson Co., Waterville, Conn.  
 Bridgeport Screw Co., Bridgeport, Conn.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Chicago Rivet & Machine Co., Cicero, Ill.  
 Continental Screw Co., New Bedford, Mass.  
 Downs-Smith Brass & Copper Co., New York City.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 ●Hussey & Co., C. G., Pittsburgh, Pa.  
 National Screw & Mfg. Co., Cleveland, O.  
 Revere Copper and Brass Incorporated, New York City.  
 (Brass and copper)  
 Townsend Co., New Brighton, Pa.

## RIVETS, STEEL

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 Atlas Bolt & Screw Co., Cleveland, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Inland Steel Co., Chicago, Ill.  
 Townsend Co., New Brighton, Pa.  
 United States Steel Corp., Pittsburgh, Pa.

## ROD, WELDING

Air Reduction Sales Co., New York City.  
 Aluminum Company of America, Pittsburgh, Pa. (Aluminum)  
 American Brass Co., Waterbury, Conn.  
 American Chain Co., Inc., Bridgeport, Conn.  
 American Steel Co., Pittsburgh, Pa.  
 American Steel & Wire Co., Chicago, Ill.  
 Bridgeport Brass Co., Bridgeport, Conn.  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Chicago Steel & Wire Co., Chicago, Ill.  
 Colonial Alloys Co., Philadelphia, Pa.  
 Continental Screw Co., New Bedford, Mass.  
 Crucible Steel Co. of America, New York City.  
 Handy & Harmon, New York City.  
 Imperial Brass Mfg. Co., Chicago, Ill.  
 ●International Nickel Co., Inc., New York City. (Monel)  
 Lee & Son Co., K. O., Aberdeen, S. D.  
 Linde Air Products Co., New York City.  
 McKay Co., Pittsburgh, Pa.  
 Maurath, Inc., Cleveland, O.  
 Milburn Co., Alexander, Baltimore, Md.  
 Page Steel & Wire Co., Monessen, Pa. (Stainless Steel)  
 Revere Copper and Brass Incorporated, New York City.  
 Torch Weld Equipment Co., Chicago, Ill.  
 Una Welding, Inc., Cleveland, O.  
 United States Steel Corp., Pittsburgh, Pa.  
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.  
 Wickwire Spencer Steel Co., New York City.  
 ●Youngstown Sheet & Tube Co., Youngstown, O.

## ROOFING, ALUMINUM

Certain-teed Products Corporation, New York City.  
 Fingles, Inc., W. A., Baltimore, Md.

## ROOFING, BUILT-UP

American Brass Co., Waterbury, Conn.  
 Barber Co., Inc., Philadelphia, Pa.  
 Barrett Co., New York City.  
 Bird & Son, Inc., East Walpole, Mass.  
 Cabot, Inc., Samuel, Boston, Mass.  
 Carey Co., Philip, Lockland, Cincinnati, O.  
 Certain-teed Products Corp., New York City.  
 Flintkote Co., New York City.  
 Johns-Manville, New York City.  
 Koppers Co., Pittsburgh. (Pitch and Felt)  
 Logan-Long Co., Chicago, Ill.  
 National Mfg. Corp., Towananda, N. Y.  
 Reilly Tar & Chemical Corp., Indianapolis, Ind.  
 Robertson Co., H. H., Pittsburgh, Pa.  
 ●Ruberoide Co., New York City.  
 United States Gypsum Co., Chicago, Ill.

## ROOFING, COPPER

American Brass Co., Waterbury, Conn.  
 Berger Mfg. Div. Republic Steel Corp., Canton, O.  
 Braden Mfg. Co., Terre Haute, Ind.  
 Bridgeport Brass Co., Bridgeport, Conn.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Downs-Smith Brass & Copper Co., New York City.  
 Edwards Mfg. Co., Inc., Cincinnati, O. (Metal Shingles, Spanish Tile)  
 Fingles, Inc., W. A., Baltimore, Md.  
 Hermann & Grace Co., Brooklyn, N. Y.  
 ●Hussey & Co., C. G., Pittsburgh, Pa.  
 ●Milcor Steel Co., Milwaukee, Wis.  
 National Brass & Copper Co., Inc., Pittsburgh, Pa.  
 New Haven Copper Co., Seymour, Conn.  
 Revere Copper and Brass Incorporated, New York City.  
 Tiffin Art Metal Co., Tiffin, O.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.

## ROOFING, IRON

●American Rolling Mill Co., Middletown, O.  
 Ames Co., W. R., San Francisco, Cal.

● Advertisement in this issue. See Index to Advertisers, page 168.

Berger Mfg. Div. Republic Steel Corp., Canton, O.  
 Byers Co., A. M., Pittsburgh, Pa.  
 Globe Iron Roofing & Corrugating Co., Cincinnati, O.  
 International Steel Company, Evansville, Ind.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 Newport Rolling Mill Co., Newport, Ky.  
 ● Republic Steel Corp., Cleveland, O.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 Tiffin Art Metal Co., Tiffin, O.

### ROOFING, LEAD

Downs-Smith Brass & Copper Co., New York City.  
 Eagle-Picher Lead Co., Cincinnati, Ohio.  
 Fingles, Inc., W. A., Baltimore, Md.  
 National Lead Co., New York City.  
 Rochester Lead Works, Rochester, N. Y.

### ROOFING, SLATE

Bangor-Washington Slate Co., Bangor, Pa.  
 Certain-teed Products Corporation, New York City.  
 Chapman Slate Co., Bethlehem, Pa.  
 Jackson-Bangor Slate Co., Pen Argyl, Pa.  
 North Bangor Slate Co., Bangor, Pa.  
 Rising & Nelson Slate Co., West Pawlet, Vt.  
 Sheldon Slate Products Co., Granville, N. Y.  
 Structural Slate Co., Pen Argyl, Pa.  
 Vendor Slate Co., Inc., Nazareth, Pa.  
 Vermont Structural Slate Co., Fair Haven, Vt.

### ROOFING, STEEL

Allegheny Ludlum Steel Corp., Brackenridge, Pa.  
 ● American Rolling Mill Co., Middletown, Ohio.  
 Ames Co., W. R., San Francisco.  
 Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.  
 Braden Mfg. Co., Terre Haute, Ind.  
 Carnegie-Illinois Steel Corp., Pittsburgh.  
 Colonial Alloys Co., Philadelphia. (Corrugated Sheets)  
 Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.  
 Continental Steel Corp., Kokomo, Ind.  
 Inland Steel Co., Chicago.  
 International Steel Company, Evansville, Ind.  
 Jones & Laughlin Steel Corp., Pittsburgh.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ● Milcor Steel Co., Milwaukee.  
 New Delphos Mfg. Co., Delphos, Ohio.  
 Newport Rolling Mill Co., Newport, Ky.  
 Parkersburg Iron & Steel Co., Parkersburg, W. Va.  
 Reeves Steel & Mfg. Co., Dover, Ohio.  
 ● Republic Steel Corp., Cleveland.  
 Robertson Co., H. H., Pittsburgh.  
 Southern States Iron Roofing Co., Savannah, Ga.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 Truscon Steel Co., Youngstown, Ohio.  
 Tiffin Art Metal Co., Tiffin, Ohio.  
 United States Steel Corp., Pittsburgh.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.  
 Wheeling Steel Corporation, Wheeling, W. Va.  
 ● Youngstown Sheet & Tube Co., Youngstown, Ohio.

### ROOFING, TILE (CLAY & CONCRETE)

Hood Co., B. Mifflin, Daisy, Tenn. (Clay)  
 Ludowici-Celadon Co., Chicago, Ill.  
 ● Lyon, Conklin & Co., Inc., Baltimore, Md.  
 Murray Tile Co., Cloverport, Ky.  
 National Fireproofing Corp., Pittsburgh.  
 United States Gypsum Co., Chicago.

### ROOFING, TERNE PLATE

Berger Mfg. Div., Republic Steel Corp., Canton, Ohio.  
 Carnegie-Illinois Steel Corp., Pittsburgh.  
 ● Cincinnati Sheet Metal & Roofing Co., Cincinnati, Ohio.  
 Follansbee Bros. Co., Pittsburgh.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ● Milcor Steel Co., Milwaukee.  
 New Delphos Mfg. Co., Delphos, Ohio.  
 ● Republic Steel Corp., Cleveland.  
 Tiffin Art Metal Co., Tiffin, Ohio.  
 United States Steel Corp., Pittsburgh.  
 Weirton Steel Co., Weirton, W. Va.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.  
 ● Youngstown Sheet & Tube Co., Youngstown, Ohio.

### ROOFING, TIN

Berger Mfg. Div. of Republic Steel Corp., Canton, O.  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Follansbee Bros. Co., Pittsburgh, Pa.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ● Milcor Steel Co., Milwaukee, Wis.  
 New Delphos Mfg. Co., Delphos, Ohio.  
 Southern States Iron Rfg. Co., Savannah, Ga.  
 Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 United States Steel Corp., Pittsburgh, Pa.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.

### ROOFING, ZINC

American Zinc Products Co., Greencastle, Ind.  
 Barnes Metal Products Co., Chicago, Ill.  
 Illinois Zinc Co., Peru, Ill.  
 Matthiessen & Hegeler Zinc Co., La Salle, Ill.  
 Southern States Iron Rfg. Co., Savannah, Ga.  
 Van Noorden Co., E., Boston, Mass.  
 Wheeling Corrugating Co., Wheeling, W. Va. (Coated)  
 Wheeling Steel Corp., Wheeling, W. Va. (Coated)

### SAVERS, HEAT

Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y.  
 Barclay, Inc., Robert, Chicago.  
 Bedard Mfg. Co., Minneapolis, Minn. (Smoke Pipe)  
 Cary Mfg. Co., Waupaca, Wis.  
 Chinook, Inc., St. Paul, Minn.  
 ● Condensation Engineering Corp., Chicago, Ill.  
 Crown Fuel Saver Co., Richmond, Ind.  
 Gerhardt, W. F., Richmond, Va.  
 Harvey-Whipple, Inc., Springfield, Mass.  
 Industrial Sheet Metal Works, Inc., Detroit.  
 Roberts-Hamilton Co., Minneapolis, Minn.  
 Wolff Coal Saver Co., Chicago, Ill.  
 Woolery Machine Co., Minneapolis, Minn.

### SAWS, BAND, SHEET METAL CUTTING

Barnes, W. O., Detroit.  
 Continental Machine Specialties, Inc., Minneapolis. (Rotary)  
 Grob Brothers, Grafton, Wis.  
 Disston & Sons, Inc., Henry, Tacony Sta., Philadelphia.  
 Tannewitz Works, Grand Rapids, Mich.  
 Wells Mfg. Corp., Three Rivers, Mich.

### SCREWS, DRIVE

American Screw Co., Providence, R. I.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 (Stainless Steel)  
 Continental Screw Co., New Bedford, Mass.  
 Corbin Screw Corp., New Britain, Conn.  
 Deniston Co., Chicago, Ill.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 National Lock Co., Rockford, Ill.  
 National Screw & Mfg. Co., Cleveland, O.  
 ● Parker-Kalon Corp., New York City. (Hardened Metallic)  
 Townsend Co., New Brighton, Pa.  
 Turner & Seymour Mfg. Co., Torrington, Conn.

### SCREWS, SELF-TAPPING

Continental Screw Co., New Bedford, Mass.  
 Corbin Screw Corporation, New Britain, Conn.  
 National Lock Co., Rockford, Ill.  
 National Screw & Mfg. Co., Cleveland, O.  
 ● Parker-Kalon Corp., New York City.  
 Shakeproof Lock Washer Co., Chicago, Ill.  
 ● United States Register Co., Battle Creek, Mich.

### SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)  
 American Screw Co., Providence, R. I.  
 Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.  
 (Stainless Steel)  
 Continental Screw Co., New Bedford, Mass.  
 Corbin Screw Corporation, New Britain, Conn.  
 Hassall, Inc., John, Brooklyn, N. Y.  
 National Lock Co., Rockford, Ill.  
 National Screw & Mfg. Co., Cleveland, O.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Parker-Kalon Corp., New York City.
- Townsend Co., New Brighton, Pa.
- United States Register Co., Battle Creek, Mich.

### SHEARS, CIRCLE, HAND

- Crescent Tool Co., Jamestown, N. Y.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

### SHEARS, HAND AND BENCH

*See Snips and Shears, Bench and Hand*

### SHEARS AND PUNCHES COMBINED

*See Punches and Shears Combined*

### SHEARS, PORTABLE, ELECTRIC

- Black & Decker Mfg. Co., Towson, Md.
- G. D. S. Machinery & Supply Co., New York City.
- Glasscock Bros. Mfg. Co., Muncie, Ind.
- Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

### SHEARS, ROTARY, SLITTING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Wagner, C. DeWitt, Cedar Rapids, Iowa.

### SHEARS, SQUARING, FOOT

- Bertsch & Co., Cambridge City, Ind.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Royersford Foundry & Machine Co., Royersford, Pa.

### SHEARS, SQUARING, POWER

- Beatty Machine & Mfg. Co., Hammond, Ind.
- Bertsch & Co., Cambridge City, Ind.
- Bliss & Co., E. W., Toledo, Ohio.
- Buffalo Forge Co., Buffalo, N. Y.
- Cincinnati Shaper Co., Cincinnati, Ohio.
- Cleveland Punch & Shear Works Co., Cleveland.
- Dreis & Krump Mfg. Co., Chicago.
- Excelsior Tool and Machine Co., East St. Louis, Ill.
- Niagara Machine & Tool Works, Buffalo.
- Pels & Co., Inc., Henry, New York City.
- Rock River Machine Co., Inc., Janesville, Wis.

### SHEET METAL PARTS

*See Mouldings and Trim; also Stampings, Metal*

### SHEETS, ALUMINUM

- Aluminum Company of America, Pittsburgh, Pa.
- Fairmont Aluminum Co., Fairmont, W. Va.

### SHEETS, CLAD

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- Crucible Steel Co. of America, New York City.
- International Nickel Co., Inc., New York City. (Nickel Clad)
- Lukens Steel Co., Coatesville, Pa.

### SHEETS, COPPER

- American Brass Co., Waterbury, Conn.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Downs-Smith Brass & Copper Co., New York City.
- Hussey & Co., C. G., Pittsburgh, Pa.
- National Brass & Copper Co., Inc., Pittsburgh, Pa.
- New Haven Copper Co., Seymour, Conn.
- Revere Copper and Brass Incorporated, New York City.
- U. S. Brass & Copper Co., Hyde Park, Mass.

### SHEETS, COPPER BEARING STEEL

- American Rolling Mill Co., Middletown, O.
- Apollo Steel Co., Apollo, Pa.

- Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Columbia Steel Co., San Francisco, Cal.
- Granite City Steel Co., Granite City, Ill.
- Gulf States Steel Co., Birmingham, Ala.
- Inland Steel Co., Chicago, Ill.
- Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
- Lukens Steel Co., Coatesville, Pa.
- Mahoning Valley Steel Co., Niles, O.
- Newport Rolling Mill Co., Newport, Ky.
- Niles Rolling Mill Co., Niles, O.
- Otis Steel Co., Cleveland, O.
- Reeves Steel & Mfg. Co., Dover, O.
- Republic Steel Corp., Cleveland, O.
- Sharon Steel Co., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- United States Steel Corp., Pittsburgh, Pa.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

### SHEETS, COPPER, LEAD COATED

- American Brass Co., Waterbury, Conn.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Downs-Smith Brass & Copper Co., New York City.
- Hussey & Co., C. G., Pittsburgh, Pa.
- Ledkote Products Co., Long Island City, N. Y.
- National Brass & Copper Co., Inc., Pittsburgh, Pa.
- New Haven Copper Co., Seymour, Conn.
- Revere Copper & Brass Incorporated, New York City.
- U. S. Brass & Copper Co., Hyde Park, Mass.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.

### SHEETS, GALVANNEALED

- Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Continental Steel Corp., Kokomo, Ind.
- Granite City Steel Co., Granite City, Ill.
- Newport Rolling Mill Co., Newport, Ky.
- Republic Steel Corp., Cleveland, O.
- Sharon Steel Corp., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- United States Steel Corp., Pittsburgh, Pa.
- Youngstown Sheet & Tube Co., Youngstown, O.

### SHEETS, LEAD

- Andrews Lead Co., Inc., Long Island City, N. Y.
- Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
- Eagle-Picher Lead Co., Cincinnati, O.
- Flemm Lead Co., Inc., Long Island City, N. Y.
- Liasberger & Son, Inc., Marks, Long Island City, N. Y.
- National Lead Co., New York City.
- Rochester Lead Works, Rochester, N. Y.
- Standard Rolling Mills, Inc., Brooklyn, N. Y.

### SHEETS, SPECIAL METAL

(Nickel Zinc, Chrome Zinc, Nickel Coated Copper, Chromium Coated Copper, Nickel Coated Steel, Chromium Coated Steel, Chromium Coated Nickel Silver, Zinc Brass, Zinc Copper, etc.)

- American Nickeloid Co., Peru, Ill.
- Apollo Metal Works, Chicago. (Nickel Alloy)
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Hussey & Co., C. G., Pittsburgh, Pa.
- Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago, Ill.
- Lukens Steel Co., Coatesville, Pa.
- Lustro Coated Sheets Co., Pittsburgh, Pa.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Maysteel Products, Inc., Mayville, Wis.
- National Sheet Metal Co., Peru, Ill.
- Revere Copper and Brass Incorporated, New York City.
- Wilder Manufacturing Company, Niles, O.

### SHEETS, STAINLESS

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- American Rolling Mill Co., Middletown, O.
- Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Crucible Steel Co. of America, New York City. (Two-Ply)
- Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago, Ill. (Two-Ply)

● Advertisement in this issue. See Index to Advertisers, page 168.



- International Nickel Co., New York City. (Monel)
- Jessop Steel Co., Washington, Pa.
- Republic Steel Corp., Cleveland, O.
- Ryerson & Son, Inc., Jos. T., Chicago, Ill.
- Sharon Steel Corp., Sharon, Pa.
- Superior Steel Corp., Pittsburgh, Pa.
- United States Steel Corp., Pittsburgh, Pa.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.

## SHEETS, STEEL

(Polished and Blue, Corrugated and Plain, Black, Terne and Galvanized)

- American Rolling Mill Co., Middletown, O.
- Apollo Steel Co., Apollo, Pa.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Byers Co., A. M., Pittsburgh.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Columbia Steel Co., San Francisco, Cal.
- Continental Steel Corp., Kokomo, Ind.
- Crucible Steel Company of America, New York City.
- Empire Sheet & Tin Plate Co., Mansfield, O.
- Follansbee Brothers Co., Pittsburgh, Pa.
- Granite City Steel Co., Granite City, Ill.
- Gulf States Steel Co., Birmingham, Ala.
- Inland Steel Co., Chicago, Ill.
- Jones & Laughlin Steel Corp., Pittsburgh, Pa.
- Lukens Steel Co., Coatesville, Pa.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Mahoning Valley Steel Co., Niles, O.
- New Delphos Mfg. Co., Delphos, Ohio.
- Newport Rolling Mill Co., Newport, Ky.
- Niles Rolling Mill Co., Niles, O.
- Otis Steel Co., Cleveland, O.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Reeves Steel & Mfg. Co., Dover, O.
- Republic Steel Corp., Cleveland, Ohio.
- Sharon Steel Co., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- United States Steel Corp., Pittsburgh, Pa.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Wood Steel Co., Alan, Conshohocken, Pa.
- Youngstown Sheet & Tube Co., Youngstown, O.

## SHEETS, TIN

- Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
- Berger Mfg. Div. Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.
- Crucible Steel Company of America, New York City.
- Eagle-Picher Lead Co., Cincinnati, O.
- Empire Sheet & Tin Plate Co., Mansfield, O.
- Follansbee Brothers Co., Pittsburgh, Pa.
- Granite City Steel Co., Granite City, Ill.
- Inland Steel Co., Chicago, Ill.
- Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Tinned)
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- National Lead Co., New York City.
- Rochester Lead Works, Inc., Rochester, N. Y.
- Standard Rolling Mills, Inc., Brooklyn, N. Y.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- United States Steel Corp., Pittsburgh, Pa.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

## SHEETS, ZINC

- American Nickeloid Co., Peru, Ill.
- American Zinc Products Co., Greencastle, Ind.
- Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
- Hegeler Zinc Co., Danville, Ill.
- Illinois Zinc Co., Peru, Ill.
- Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- New Jersey Zinc Sales Co., New York City.
- Wheeling Corrugating Co., Wheeling, W. Va. (Coated)
- Wheeling Steel Corp., Wheeling, W. Va. (Coated)

## SHIELDS, WARM AIR REGISTER

- Gammeter Co., W. F., Cadiz, O. (With Humidifier)
- Gillian Mfg. Co., Ferndale, Mich.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Patent Novelty Co., Fulton, Ill. (With Humidifier)

- Pentecost & Craft Co., Terre Haute, Ind.
- Schoedinger, F. O., Co., Columbus, O.

## SHINGLES AND TILE, METAL

- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Columbian Enameling & Stamping Co., Terre Haute, Ind.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Fingles, Inc., W. A., Baltimore, Md.
- Globe Iron Roofing & Corrugating Co., Cincinnati, O.
- Gulf States Steel Co., Birmingham, Ala.
- International Steel Co., Evansville, Ind.
- Milcor Steel Co., Milwaukee, Wis.
- Miller & Doing, Inc., Brooklyn, N. Y.
- New Haven Copper Co., Seymour, Conn. (Copper)
- Newport Rolling Mill Co., Newport, Ky.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Reeves Steel & Mfg. Co., Dover, O.
- St. Paul Corrugating Co., St. Paul, Minn.
- Southern States Iron Roofing Co., Savannah, Ga.
- Tiffin Art Metal Co., Tiffin, O.
- United States Steel Corp., Pittsburgh, Pa.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.

## SHUTTERS

See Louvers and Shutters

## SKYLIGHTS

- American Barlock Co., Inc., Long Island City, N. Y.
- American Sheet Metal Works, New Orleans, La.
- Anderson Mfg. Co., Des Moines, Ia.
- Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
- Brundage Co., Kalamazoo, Mich.
- California Cornice, Steel and Supply Corp., Los Angeles, Cal.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Danzer Metal Works Co., Hagerstown, Md.
- Decatur Iron & Steel Co., Decatur, Ala.
- Drouve Co., G., Fairfield, Conn.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Falstrom Co., Passaic, N. J.
- Fingles, Inc., W. A., Baltimore, Md.
- General Sheet Metal Works, Inc., Bridgeport, Conn.
- Goethel Co., Alfred C., Milwaukee, Wis.
- Herrmann & Grace Co., Brooklyn, N. Y.
- Hirschman Co., Inc., W. F., Buffalo, N. Y.
- Hudson Equipment Corp., Minneapolis, Minn.
- International Steel Co., Evansville, Ind.
- Klauser Mfg. Co., Dubuque, Ia.
- Lee & Son Co., Thomas, Cincinnati, O.
- Martin Metal Mfg. Co., Wichita, Kan.
- Mesker & Co., Geo. L., Evansville, Ind.
- Midwest Aluminum Products, Inc., Milwaukee, Wis.
- Midwest Ventilating Works, Milwaukee, Wis.
- Milcor Steel Co., Milwaukee, Wis.
- Mohler Co., The J. K., Ephrata, Pa.
- Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
- Park City Cornice Works, Inc., Bridgeport, Conn.
- Perkinson & Brown, Chicago, Ill.
- Providence Cornice Co., Providence, R. I.
- Robertson Co., H. H., Pittsburgh, Pa.
- Ryniker Sheet Metal Works, Inc., Billings, Mont.
- St. Paul Corrugating Co., St. Paul, Minn.
- Schoedinger, F. O., Co., Columbus, O.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Southern States Iron Roofing Co., Savannah, Ga.
- Tiffin Art Metal Co., Tiffin, O.
- Van Noorden Co., E., Boston, Mass.
- Vent-O-Lite Co., Chicago, Ill. (Ventilating, Industrial, Puttyless)
- Ward Co., H. H., Chester, Pa.
- Wheeling Metal & Mfg. Co., Wheeling, W. Va.
- Willis Mfg. Co., Galesburg, Ill.
- Windshield Scupper Co., Div. Sargent Bldg. Specialties Co., New York City. (Scuppers)
- York Corrugating Co., York, Pa.

## SKYLIGHT LIFTS

See Lifts, Skylight

## SMOKE PIPE

See Pipe, Smoke

## SNIPS AND SHEARS, BENCH AND HAND

- Armstrong-Blum Mfg. Co., Chicago, Ill.
- Bartlett Mfg. Co., Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Beverly Throatless Shear Co., Chicago, Ill.
- Bremil Mfg. Co., Erie, Pa. (Shears)
- Clauss Shear Co., Fremont, O.
- Crescent Tool Co., Jamestown, N. Y.
- G. D. S. Machinery & Supply Co., New York City.
- Grobet File Corp. of America, New York City.
- Marshalltown Mfg. Co., Marshalltown, Ia.
- Niagara Machine & Tool Works, Buffalo, N. Y.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rupp Forge & Shear Co., Cleveland, O.
- Viking Shear Co., Erie, Pa.
- Weiss & Co., H., New York City.
- Whitney Metal Tool Co., Rockford, Ill.
- Wiss & Sons Co., J., Newark, N. J.

## SOLDER

- Allen Co., L. B., Chicago, Ill.
- Alumaweld Co. of America, Chicago, Ill. (Aluminum)
- American Brass Co., Waterbury, Conn.
- American Solder & Flux Co., Philadelphia, Pa.
- Andrews Lead Co., Inc., Long Island City, N. Y.
- Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
- Consolidated Metals Corp., Detroit, Mich.
- Downs-Smith Brass & Copper Co., New York City.
- Eagle-Picher Co., Cincinnati, O. (Bar and Wire)
- Empire Metal Co., Syracuse, N. Y.
- Gardiner Metal Co., Chicago, Ill.
- Handy & Harmon, New York City.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Johnston Tin Foil & Metal Co., St. Louis, Mo.
- Kester Solder Co., Chicago, Ill.
- Klee Co., Geo. B., Cincinnati, O.
- Lissberger & Son, Inc., Marks, Long Island City, N. Y.
- Lukens Metal Co., Thos. F., Philadelphia, Pa.
- Merchant & Evans Co., Philadelphia, Pa.
- National Lead Co., New York City.
- New Delphos Mfg. Co., Delphos, O.
- Ruby Chemical Co., Columbus, O. (Acid and Rosin Core)
- Ryerson & Son, Inc., Joseph T., Chicago, Ill.
- Standard Rolling Mills, Inc., Brooklyn, N. Y.
- Wagner, C. DeWitt, Cedar Rapids, Ia. (Aluminum)
- Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

## SOLDERING COPPERS

*See Coppers, Soldering*

## SOLDERING FLUX

*See Flux Soldering*

## SOLDERING FURNACES

*See Furnaces, Soldering*

## SOLDERING IRONS

*See Coppers, Soldering*

## SOLDERING TORCHES

*See Torches, Soldering*

## SOLENOID VALVES

*See Valves, Solenoid*

## SOUND LEVEL INDICATORS

*See Indicators, Sound Level*

## STAMPINGS, METAL

- Ames Co., W. R., San Francisco.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
- Bossert Company, Inc., Utica, N. Y.
- Budke Stamping Co., Canonsburg, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Dall Steel Products Co., Lansing, Mich.
- Dayton Rogers Mfg. Co., Minneapolis, Minn.
- Friedley-Voshardt Co., Chicago, Ill.
- General Metal Products Co., St. Louis, Mo.
- Geuder, Paeschke & Frey Co., Milwaukee, Wis.
- Gillian Mfg. Co., Ferndale, Mich.
- Globe Machine & Stamping Co., Cleveland, O.
- Lukens Steel Co., Coatesville, Pa.
- Maysteel Products, Inc., Mayville, Wis.
- Mullins Mfg. Co., Warren, Ohio.
- New Delphos Mfg. Co., Delphos, Ohio.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Perrin Company, Edward C., Camden, N. J.
- Royal-Apex Mfg. Corp., Brooklyn, N. Y.
- Standard Stamping & Perforating Co., Chicago, Ill.
- Tannewitz Works, Grand Rapids, Mich.
- Wrought Washer Mfg. Co., Milwaukee, Wis.

## STOKER CONTROLS

*See Controls, Stoker*

## STOKERS, DOMESTIC

- Advance Appliance Co., Peoria, Ill.
- Airtemp, Inc., Dayton, O.
- Anchor Stove & Range Co., New Albany, Ind.
- Athens Flow Co., Athens, Tenn.
- Auburn Burner Co., Auburn, Ind.
- Auburn Stoker Co., Auburn, Ind.
- Automatic Stoker Corp., Indianapolis, Ind.
- Bardes Range & Foundry Co., E. H., Cincinnati, O.
- Beckley Perforating Co., Garwood, N. J. (Anthracite)
- Bluffton Mfg. Co., Findlay, O.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- Brownell Co., Dayton, O.
- Burnham Stoker Co., Vancouver, Wash.
- Burnwell Corp., Allentown, Pa.
- Butler Mfg. Co., Kansas City, Mo.
- Butler Street Foundry & Iron Co., Chicago, Ill.
- Carrier Corp., Syracuse, N. Y.
- Chicago Automatic Stoker Co., Not Inc., Chicago, Ill.
- Christensen Machine Co., Salt Lake City, Utah.
- Comet Electric Company, Indianapolis, Ind.
- Conco-Sampsel Stoker Corp., Mendota, Ill.
- Cooper & Cooper, Inc., Pittsfield, Mass. (Anthracite)
- Crane Co., Chicago. (Bituminous & Anthracite)
- Crouch Corporation, Birmingham, Mich.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corp., Dayton, Ohio.
- Dickson & Eddy, New York City.
- Econocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.
- Eddy Stoker Corp., Chicago, Ill.
- Electric Furnace-Man, Inc., New York City.
- Excelsior Steel Furnace Co., Chicago.
- Fairbanks, Morse & Co., Chicago, Ill.
- Finnell Rotary Stokers, Inc., Elkhart, Ind.
- Flynn and Emrich Co., Baltimore, Md.
- Frederick Iron & Steel Co., Frederick, Md.
- Fuel Saver, Inc., Harrisburg, Pa.
- Furnaceslave, Inc., Indianapolis, Ind.
- Gehl Bros. Mfg. Co., West Bend, Wis.
- General Machine Co., Inc., New York City.
- General Machinery Co., Spokane, Wash.
- General Stokers, Inc., Philadelphia. (Anthracite)
- Germer Stove Co., Erie, Pa.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hamilton Automatic Stoker Corp., Hamilton, O.
- Heating Assurance, Inc., Spokane, Wash.
- Hemp Engineering & Stoker Corp., Macomb, Ill.
- Heritage Stoker Sales, Inc., Chicago, Ill.
- Hess Warming and Ventilating Co., Chicago, Ill.
- Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit.
- Illinois Iron & Bolt Co., Chicago, Ill.
- Iron Fireman Mfg. Co., Cleveland, O.
- Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Kol-Master Corp., Oregon, Ill.
- Leach Co., Oshkosh, Wis.
- Liberty Coal Burner Co., St. Louis, Mo.
- Link Belt Co., Chicago, Ill.
- "Loyal Knight" Mfg. Corp., Belleville, Ill.
- Meler Electric & Machine Co., Indianapolis, Ind.
- Meyer Furnace Co., Peoria, Ill.
- Micro-Westco, Inc., Bettendorf, Ia.
- Model Mfg. Co., Richmond, Va.
- Moloch Foundry & Machine Co., Kaukauna, Wis.
- Morse Chain Co., Ithaca, N. Y.
- Motorstoker Div. of Hershey Machine & Foundry Co., Manheim, Pa.
- Muncie Gear Works, Inc., Muncie, Ind.
- National Steam Pump Co., Upper Sandusky, O.
- Nelson Corp., Herman, Moline, Ill.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
- Ormsby-Osterman Co., St. Louis, Mo.
- Peerless Mfg. Co., Louisville, Ky.
- Perfectaire Corp., Baltimore, Md.
- Plymouth Industries, Inc., Plymouth, Ind.
- Pulvokol, Inc., Minneapolis, Minn. (Pulverized Coal Burner)
- Racine Stoker Mfg. Co., Racine, Wis.
- Reliance Electric & Engineering Co., Cleveland.
- Risdon Stoker Corp., Seattle, Wash.
- Rudy Furnace Co., Dowagiac, Mich.
- Schwab Furnace & Mfg. Co., Milwaukee, Wis.
- Schwab Safe Co., Lafayette, Ind.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Sinker-Davis Co., Indianapolis, Ind.
- Steel Products Engineering Co., Springfield, O.
- Stok-A-Fire Co., Inc., University City, Mo.
- Stokerette Mfg. Co., Chicago, Ill.
- Stokermatic Co., Salt Lake City, Utah.
- Stoker Products, Inc., Decatur, Ill.

● Advertisement in this issue. See Index to Advertisers, page 168.

Tropic-Air Stoker Co., Canton, O.  
 U. S. Machine Corporation, Lebanon, Ind.  
 Whiting Corp., Harvey, Ill.  
 Will-Burt Co., Orrville, O.

## STOKERS, INDUSTRIAL AND COMMERCIAL

American Coal Burner Co., Chicago, Ill.  
 American Engineering Co., Philadelphia.  
 Anchor Stove & Range Co., New Albany, Ind.  
 Auburn Burner Co., Auburn, Ind.  
 Auburn Stoker Co., Auburn, Ind.  
 Bluffton Mfg. Co., Findlay, O.  
 Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.  
 Brownell Co., Dayton, O.  
 Butler Mfg. Co., Kansas City, Mo.  
 Butler Street Foundry & Iron Co., Chicago, Ill.  
 Canton Stoker Corp., Canton, O.  
 Carnes, Inc., John R., Lima, O.  
 Chicago Automatic Stoker Co., Not Inc., Chicago, Ill.  
 Christensen Machine Co., Salt Lake City, Utah.  
 Columbus Metal Products, Inc., Columbus, O.  
 Combustion Engineering Co., Inc., New York City.  
 Conco-Sampsel Stoker Corp., Mendota, Ill.  
 Crown Iron Works, Minneapolis, Minn.  
 Delta Stoker Co., North Chicago, Ill.  
 Detroit Stoker Co., Detroit and Monroe, Mich.  
 Diamond Castings Co., Johnsonburg, Pa.  
 Eeonocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.  
 Eddy Stoker Corp., Chicago, Ill.  
 Electric Furnace-Man, Inc., New York City.  
 Fairbanks, Morse & Co., Chicago, Ill.  
 Flynn & Emrich Co., Baltimore, Md.  
 Frederick Iron & Steel Co., Frederick, Md.  
 Fuel Savers Inc., Harrisburg, Pa.  
 Gehl Bros. Mfg. Co., West Bend, Wis.  
 General Machinery Co., Spokane, Wash.  
 General Stokers, Inc., Philadelphia. (Anthracite)  
 Hamilton Automatic Stoker Corp., Hamilton, O.  
 Hare Stoker Corp., Detroit, Mich.  
 Heating Assurance, Inc., Spokane, Wash.  
 Hemp Engineering & Stoker Corp., Macomb, Ill.  
 Her-Born Eng. & Mfg. Co., Sandusky, O.  
 Heritage Stoker Sales, Inc., Chicago, Ill.  
 Holcomb & Hoke Mfg. Co., Indianapolis, Ind.  
 Illinois Iron & Bolt Co., Chicago, Ill.  
 Iron Fireman Mfg. Co., Cleveland, O.  
 Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.  
 Johnston & Jennings Co., Cleveland, O.  
 •Kol-Master Corp., Oregon, Ill.  
 Leach Co., Oshkosh, Wis.  
 Link Belt Co., Chicago, Ill.  
 McClave-Brooks Co., Scranton, Pa.  
 Marion Machine Foundry & Supply Co., Marion, Ind.  
 Mesker & Co., Geo. L., Evansville, Ind.  
 •Meyer Furnace Co., Peoria, Ill.  
 Model Mfg. Co., Richmond, Va.  
 Moloch Foundry & Machine Co., Kaukauna, Wis.  
 Morse Chain Co., Ithaca, N. Y.  
 Motorstoker Div. of Hershey Machine & Foundry Co., Manheim, Pa.  
 National Steam Pump Co., Upper Sandusky, O.  
 Neemes Foundry, Inc., Troy, N. Y.  
 Ormsby-Osterman Co., St. Louis, Mo.  
 Over-Spred Stoker Co., Ottawa, Ill.  
 Patterson Foundry & Machine Co., East Liverpool, O.  
 Perfectaire Corp., Baltimore, Md.  
 Perfection Grate & Stoker Co., Springfield, Mass.  
 Plymouth Industries, Inc., Plymouth, Ind.  
 Racine Stoker Mfg. Co., Racine, Wis.  
 Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.  
 Schwab Safe Co., Lafayette, Ind.  
 •Schwitzer-Cummins Co., Indianapolis, Ind.  
 Steel Products Engineering Co., Springfield, O.  
 Stok-a-Fire Co., Inc., University City, Mo.  
 Stokermatic Co., Salt Lake City, Utah.  
 Stoker Products, Inc., Decatur, Ill.  
 Tropic-Air Stoker Co., Canton, O.  
 U. S. Machine Corporation, Lebanon, Ind.  
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.  
 Whiting Corp., Harvey, Ill.  
 Will-Burt Co., Orrville, O.

## STRAINERS, CONDUCTOR

*See Fittings and Accessories, Conductor*

## STRAPS, LEADER

*See Fittings and Accessories, Conductor*

## SWITCHES, MAGNETIC

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
 Allen-Bradley Co., Milwaukee, Wis.

Automatic Switch Co., New York City.  
 Bender Warrick Corp., Birmingham, Mich.  
 Clark Controller Corp., Birmingham, Mich.  
 •Cook Electric Co., Chicago, Ill.  
 Cutler-Hammer, Inc., Milwaukee, Wis.  
 •Detroit Lubricator Co., Detroit, Mich.  
 Dunn, Inc., Struthers, Philadelphia, Pa.  
 Electric Controller & Mfg. Co., Cleveland, O.  
 General Electric Co., Schenectady, N. Y.  
 Guardian Electric Mfg. Co., Chicago, Ill.  
 H-B Instrument Co., Inc., Philadelphia, Pa.  
 Hart Mfg. Co., Hartford, Conn. (Mercury Tube)  
 Industrial Engineering Corp., Evansville, Ind.  
 Jefferson Electric Co., Bellwood, Ill.  
 •Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Monitor Controller Co., Baltimore, Md.  
 Penn Electric Switch Co., Goshen, Ind.  
 Perfex Corp., Milwaukee, Wis.  
 Ranco, Inc., Columbus, O.  
 Square D Co., Detroit, Mich.  
 Tork Clock Co., Inc., Mt. Vernon, N. Y.  
 Trumbull Electric Mfg. Co., Plainville, Conn.  
 Ward Leonard Electric Co., Mt. Vernon, N. Y.  
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.  
 White-Rodgers Electric Co., St. Louis, Mo.  
 Zenith Electric Co., Chicago.

## SWITCHES, MANUAL

Allen-Bradley Co., Milwaukee, Wis.  
 Bender Warrick Corp., Birmingham, Mich.  
 Cutler-Hammer, Inc., Milwaukee, Wis.  
 Electric Controller & Mfg. Co., Cleveland, O.  
 General Electric Co., Schenectady, N. Y.  
 Industrial Engineering Corp., Evansville, Ind.  
 Square D Co., Detroit, Mich.  
 Trumbull Electric Mfg. Co., Plainville, Conn.  
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## SWITCHES, TIME

Automatic Temperature Control, Inc., New York City.  
 General Electric Co., Schenectady, N. Y.  
 •Gleason-Avery, Inc., Auburn, N. Y.  
 Guardian Electric Mfg. Co., Chicago, Ill.  
 Industrial Engineering Corp., Evansville, Ind.  
 •Mercoide Corp., Chicago, Ill.  
 Paragon Electric Co., Chicago, Ill.  
 Penn Electric Switch Co., Goshen, Ind.  
 Rhodes, Inc., M. H., Hartford, Conn.  
 Sampsel Time Control, Inc., Mendota, Ill.  
 Sangamo Electric Co., Springfield, Ill.  
 Spencer Thermostat Co., Attleboro, Mass.  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.  
 Tork Clock Co., Inc., Mt. Vernon, N. Y.  
 Ward Leonard Electric Co., Mt. Vernon, N. Y.  
 Zenith Electric Co., Chicago, Ill.

## TEES, FURNACE PIPE

*See Fittings and Accessories, Furnace Pipe*

## TEMPERATURE CONTROLS

*See Thermostats*

## TEMPERATURE RECORDERS

*See Recorders, Temperature*

## TINPLATE

*See Sheets, Tin*

## TIPS, DAMPER

*See Clips and Tips, Damper*

## THERMOMETERS, INDICATING

Barclay, Inc., Robert, Chicago, Ill.  
 Bristol Co., Waterbury, Conn.  
 Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.  
 Builders Iron Foundry, Providence, R. I.  
 Cooper Oven Thermometer Co., Pequabuck, Conn.  
 Fee & Stemwedel, Inc., Chicago, Ill.  
 •Friez & Sons, Julien P., Baltimore.  
 G. M. Mfg. Co., New York City.  
 H-B Instrument Co., Inc., Philadelphia, Pa.  
 •Illinois Testing Laboratories, Inc., Chicago, Ill.  
 Leeds & Northrup Co., Philadelphia, Pa.  
 Manning, Maxwell & Moore, Inc., Bridgeport, Conn.  
 •Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

•Advertisement in this issue. See Index to Advertisers, page 168.



Moeller Instrument Co., Richmond Hill, New York City.  
 Precision Thermometer & Instrument Co., Philadelphia, Pa.  
 Preferred Utilities Mfg. Corp., New York City.  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.  
 Taylor Instrument Companies, Rochester, N. Y.  
 Uehling Instrument Co., Paterson, N. J.  
 Weston Electrical Instrument Corp., Newark, N. J.

● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 ● White Manufacturing Co., St. Paul, Minn.

## THROUGH WALL FLASHINGS

*See Flashings, Through Wall*

## THERMOSTATS, DAY AND NIGHT, CLOCK

- Detroit Lubricator Co., Detroit, Mich.
- Gleason-Avery, Inc., Auburn, N. Y.
- Mercoid Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Tork Clock Co., Inc., Mt. Vernon, N. Y.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis, Mo.

## THERMOSTATS, HEAT ACCELERATED OR ANTICIPATING

- Automatic Products Co., Milwaukee, Wis.
- Automatic Temperature Control, Inc., New York City.
- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- Friez & Sons, Julien P., Baltimore.
- Fulton Siphon Co., Knoxville, Tenn.
- General Controls Co., Glendale, Cal.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Mercoid Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Precision Thermometer and Instrument Co., Philadelphia.
- Spencer Thermostat Co., Attleboro, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.

## THERMOSTATS, LINE VOLTAGE

- Automatic Products Co., Milwaukee, Wis.
- Automatic Temperature Control, Inc., New York City.
- Barber-Colman Company, Rockford, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- General Controls Co., Glendale, Cal.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Jefferson Electric Co., Bellwood, Ill.
- Mercoid Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- Russell Electric Co., Chicago, Ill.
- Sampsel Time Control, Inc., Mendota, Ill.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.

## THERMOSTATS, LOW VOLTAGE

- Automatic Products Co., Milwaukee, Wis.
- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago, Ill.
- Crise Electric Mfg. Co., Mt. Vernon, O.
- Detroit Lubricator Co., Detroit, Mich.
- General Controls Co., Glendale, Cal.
- Gleason-Avery, Inc., Auburn, N. Y.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Mercoid Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee, Wis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Mendota, Ill.
- Sheer Co., H. M., Quincy, Ill.
- Spencer Thermostat Co., Attleboro, Mass.
- Russell Electric Co., Chicago, Ill.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.
- White Manufacturing Co., St. Paul, Minn.

## THERMOSTATS, MODULATING OR PROPORTIONING

Barber-Colman Company, Rockford, Ill.  
 H-B Instrument Co., Inc., Philadelphia, Pa.

## TIMERS, ELECTRICAL

- Dunn, Inc., Struthers, Philadelphia, Pa.
- Friez & Sons, Julien P., Baltimore.
- Gleason-Avery, Inc., Auburn, N. Y.
- Guardian Electric Mfg. Co., Chicago, Ill.
- Industrial Engineering Corp., Evansville, Ind.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Spencer Thermostat Co., Attleboro, Mass.
- Welding Timer Mfg. Co., Newark, N. J. (Welding)
- Zenith Electric Co., Inc., Chicago, Ill.

## TINNING FLUXES

*See Compounds, Tinning*

## TOOLS, FIRING

- Farrell-Cheek Steel Company, Sandusky, Ohio.
- Northwestern Stove Repair Co., Chicago.

## TOOLS, METAL WORKERS'

- Champion Tool Co., Los Angeles, Cal. (Crimper).
- Crescent Tool Co., Jamestown, N. Y.
- Grobet File Corp. of America, New York City. (Files)
- Hub Specialty Co., Somerville, Mass. (Awl)
- Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary Hack Saw and Hole Saw)
- Niagara Machine & Tool Works, Buffalo, N. Y.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Pencilsharp Awl & Tool Co., Evansville, Ind. (Scratch Awls).
- Poe, Ralph W., Canton, Ill. (Sheet Metal Cutters)
- Stanley Tools, New Britain, Conn. (Punches, Hammers, Drills)
- Whitney Mfg. Co., W. A., Rockford, Ill.
- Whitney Metal Tool Co., Rockford, Ill.

## TOOLS, ROOFERS'

- Aerofil Burner Co., Inc., West New York, N. J. (Melting Pots).
- All States Roofers Equip. & Mat'l Co., Chicago. (Complete Line).
- Elermann Floor Scraper Co., Brooklyn, N. Y. (Tar).
- Littleford Bros., Cincinnati, O.
- Milcor Steel Co., Milwaukee, Wis.
- Niagara Machine & Tool Works, Buffalo, N. Y.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Pencilsharp Awl & Tool Co., Evansville, Ind.

## TOPS, CHIMNEY

*See Caps and Tops, Chimney*

## TORCHES, BRAZING, CUTTING, WELDING, OXY-ACETYLENE

- Air Reduction Sales Co., New York City.
- Bastian-Blessing Co., Chicago, Ill.
- Bernz Co., Inc., Otto, Rochester, N. Y. (Brazing)
- Burdett Mfg. Co., Chicago, Ill.
- Gasweld Equipment Co., Chicago.
- Harris Calorific Co., Cleveland, O.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Linde Air Products Co., New York City.
- Milburn Co., Alexander, Baltimore, Md.
- Modern Engineering Co., St. Louis, Mo.
- Sight Feed Generator Co., Richmond, Ind.
- Smith Welding Equipment Corp., Minneapolis, Minn.
- Torchweld Equipment Co., Chicago, Ill.
- Welding Apparatus Co., Chicago, Ill.

## TORCHES, SOLDERING

- Bernz Co., Inc., Otto, Rochester, N. Y.
- Clayton & Lambert Mfg. Co., Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.

Detroit Torch & Mfg. Co., Detroit, Mich.  
 Diener Mfg. Co., Geo. W., Chicago, Ill.  
 Everhot Mfg. Co., Maywood, Ill.  
 Gasweld Equipment Co., Chicago.  
 Harris Caloric Co., Cleveland, O.  
 Ideal Commutator Dresser Co., Sycamore, Ill.  
 Imperial Brass Mfg. Co., Chicago, Ill.  
 ● Johnson Gas Appliance Co., Cedar Rapids, Ia.  
 Linde Air Products Co., New York City.  
 Milburn Co., Alexander, Baltimore, Md.  
 Sight Feed Generator Co., Richmond, Ind.  
 Smith Welding Equipment Corp., Minneapolis, Minn.  
 Torchweld Equipment Co., Chicago, Ill.  
 Turner Brass Works, Sycamore, Ill.  
 Wall Mfg. Supply Co., P., Pittsburgh, Pa.  
 Welding Apparatus Co., Chicago, Ill.

## TRANSFORMERS, LOW VOLTAGE

Allis-Chalmers Mfg. Co., Milwaukee.  
 Barber-Colman Co., Rockford, Ill.  
 ● Canatsey Electric Manufacturing Co., Kansas City, Mo.  
 ● Cook Electric Co., Chicago, Ill.  
 ● Detroit Lubricator Co., Detroit, Mich.  
 ● Friez & Sons, Julien P., Baltimore.  
 General Controls Co., Glendale, Cal.  
 General Electric Co., Schenectady, N. Y.  
 Jefferson Electric Co., Bellwood, Ill.  
 ● Mercoid Corporation, Chicago.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.  
 Russell Electric Co., Chicago, Ill.  
 Taylor-Winfield Corp., Warren, O.  
 Wagner Electric Corp., St. Louis, Mo.  
 Webster Electric Co., Racine, Wis.  
 Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

## TRIM, ORNAMENTAL

*See Moulding and Trim, Ornamental*

## TUBING, COPPER

American Brass Co., Waterbury, Conn.  
 American Radiator Co., New York City.  
 Bridgeport Brass Co., Bridgeport, Conn.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Downs-Smith Brass & Copper Co., New York City.  
 ● Hussey & Co., C. G., Pittsburgh, Pa.  
 Imperial Brass Mfg. Co., Chicago, Ill.  
 Revere Copper & Brass Incorporated, New York City.  
 Roberts Tube Works, Detroit.  
 Streamline Pipe & Fittings, Div. of Mueller Brass Co., Port Huron, Mich.  
 Wolverine Tube Co., Detroit, Mich.

## UNITS, WINDOW VENTILATOR AND FILTER

Airgard Manufacturing Co., Chicago.  
 Amirton Co., New York, N. Y.  
 Burrowes Corp., Portland, Me.  
 Carrier Corp., Syracuse, N. Y.  
 Coppel Engineering Corp., Worcester, Mass.  
 Davies Air Filter Corp., New York, N. Y.  
 Economy Electric Mfg. Co., Chicago, Ill.  
 General Refrigeration Corp., Beloit, Wis.  
 Ilg Electric Ventilating Co., Chicago.  
 Kaiseraire Products Sales Co., Chicago, Ill.  
 National Laboratories, Inc., Boston, Mass.  
 Reed Unit-Fans, Inc., New Orleans, La.  
 ● Schwitzer-Cummins Co., Indianapolis, Ind.  
 Somers, Inc., H. J., Detroit, Mich.  
 Standard Air Conditioning, Inc., New York, N. Y.  
 Staynew Filter Corp., Rochester, N. Y.  
 ● Todd Air Conditioning Company, Inc., Bonner Springs, Kan.  
 Unified Air Conditioner Co., Duluth, Minn.  
 U. S. Air Conditioning Corp., Minneapolis.

## VACUUM CLEANERS FOR FURNACES

*See Cleaners, Vacuum, Furnace*

## VALVES, GAS PRESSURE REGULATING

Atlas Valve Co., Newark, N. J.  
 ● Barber Gas Burner Co., Cleveland, O.  
 Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia.  
 Bryant Corp., C. L., Cleveland, O.

Bryant Heater Co., Cleveland, O.  
 Fisher Governor Co., Marshalltown, Ia.  
 Fox Engineering Co., Boston, Mass.  
 ● Friez & Sons, Julien P., Baltimore.  
 Fulton Syphon Co., Knoxville, Tenn.  
 General Controls Co., Glendale, Cal., and Cleveland, O.  
 Hotstream Heater Co., Cleveland, O.  
 ● Mercoid Corp., Chicago, Ill.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 ● Pacific Gas Radiator Co., Los Angeles, Cal.  
 Payne Furnace & Supply Co., Beverly Hills, Cal.  
 Pittsburgh Equitable Meter Co., Pittsburgh, Pa.  
 Roberts-Gordon Appliance Corp., Buffalo, N. Y.  
 Sheer Co., H. M., Quincy, Ill.  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.

## VALVES, HUMIDIFIER, WATER LEVEL

Air Conditioning Supply Co., Cleveland, O.  
 Automatic Humidifier Co., Cedar Falls, Ia.  
 Barclay, Inc., Robert, Chicago.  
 Bishop Humidifier Co., Detroit.  
 Chandler Co., Cedar Rapids, Ia.  
 Fisher Governor Co., Marshalltown, Ia.  
 G. & S. Tool Co., Detroit, Mich.  
 McDonnell & Miller, Chicago, Ill.  
 ● Mald-O'-Mist, Inc., Chicago, Ill.  
 ● Monmouth Products Co., Cleveland, O.  
 Parks-Cramer Co., Fitchburg, Mass.  
 ● Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.  
 ● Skuttle Co., J. L., Detroit, Mich.  
 Supreme Electric Products Corp., Rochester, N. Y.  
 Turney Corp., Muskegon, Mich.  
 Universal Blower Co., Birmingham, Mich.  
 Wisconsin Humidifier Co., Milwaukee, Wis.

## VALVES, SOLENOID

Alco Valve Co., Inc., St. Louis, Mo.  
 Automatic Products Co., Milwaukee, Wis.  
 Automatic Switch Co., New York City.  
 Automatic Temperature Control, Inc., New York City.  
 Barber-Colman Co., Rockford, Ill.  
 Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.  
 Cutler-Hammer, Inc., Milwaukee, Wis.  
 Electric Valve Mfg. Co., Inc., New York City.  
 Electromatic Corp., Chicago, Ill.  
 Frick Co., Waynesboro, Pa.  
 ● Friez & Sons, Julien P., Baltimore.  
 General Controls Co., Glendale, Cal., and Cleveland, O.  
 General Electric Co., Schenectady, N. Y.  
 Guardian Electric Mfg. Co., Chicago, Ill.  
 Hunt & Son, C. B., Salem, O.  
 McCorkle Co., D. H., Berkeley, Cal.  
 ● Mercoid Corp., Chicago, Ill.  
 ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
 ● Pacific Gas Radiator Co., Los Angeles, Cal.  
 Payne Furnace & Supply Co., Beverly Hills, Cal.  
 Penn Electric Switch Co., Goshen, Ind.  
 Perflex Corp., Milwaukee, Wis.  
 Rega Mfg. Co., Rochester, N. Y.  
 R-S Products Corp., Philadelphia, Pa.  
 Supreme Electric Products Corp., Rochester, N. Y.

## VENETIAN BLINDS

*See Blinds, Venetian*

## VENTILATORS, CEILING

Airmaster Corp., Chicago, Ill.  
 ● Auer Register Co., Cleveland, O.  
 ● Autovent Fan & Blower Co., Chicago, Ill.  
 Best Register Co., Milwaukee, Wis.  
 Danzer Metal Works Co., Hagerstown, Md.  
 Decatur Iron & Steel Co., Decatur, Ala.  
 Economy Electric Manufacturing Co., Cicero, Ill.  
 Falstrom Co., Passaic, N. J.  
 Gilliam Mfg. Co., Ferndale, Mich.  
 ● Hart & Cooley Mfg. Co., Chicago, Ill.  
 Hudson Equipment Corp., Minneapolis, Minn.  
 ● Lamneck Products, Inc., Columbus, O.  
 Martin Metal Mfg. Co., Wichita, Kan.  
 ● Milcor Steel Co., Milwaukee, Wis.  
 Miller & Doig, Inc., Brooklyn, N. Y.  
 ● Tuttle & Bailey, Inc., New Britain, Conn.  
 ● United States Register Co., Battle Creek, Mich.  
 Universal Blower Co., Birmingham, Mich.

## VENTILATORS, MUSHROOM

Aeolus Dickinson, Chicago, Ill.  
 Best Register Co., Milwaukee, Wis.

● Advertisement in this issue. See Index to Advertisers, page 168.

- Falstrom Co., Passaic, N. J.
- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- Knowles Mushroom Ventilator Co., New York City.
- Mellish & Murray Co., Chicago, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Tuttle & Bailey, Inc., New Britain, Conn.

## VENTILATORS, ROOF, FAN

- Aeolus Dickinson, Chicago, Ill.
- Air Controls, Inc., Cleveland, O.
- Airmaster Corp., Chicago, Ill.
- Allen Corp., Detroit, Mich.
- American Coolair Corp., Jacksonville, Fla.
- American Foundry & Furnace Co., Bloomington, Ill.
- American-Larson Ventilating Co., Pittsburgh, Pa.
- Arex Co., Chicago, Ill.
- Autovent Fan & Blower Co., Chicago, Ill.
- Belanger Fan & Oven Co., Detroit, Mich.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Blower Application Co., Milwaukee, Wis.
- Burt Mfg. Co., Akron, O.
- California Cornice, Steel & Supply Corp., Los Angeles, Cal.
- Century Fan & Ventilator Corp., New York City.
- Clarage Fan Co., Kalamazoo, Mich.
- Clay Equipment Corp., Cedar Falls, Ia.
- DeBothezat Ventilating Equipment Division, American Machine & Metals, Inc., New York City.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago, Ill.
- Falstrom Co., Passaic, N. J.
- Fingles, Inc., W. A., Baltimore, Md.
- General Regulator Corp., Chicago, Ill.
- Goethel Co., Alfred C., Milwaukee, Wis.
- Hirschman Co., Inc., W. F., Buffalo, N. Y.
- Howes Co., S. M., Charlestown, Boston, Mass.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- International Engineering Inc., Dayton, O.
- Iona Ventilator Co., Inc., Philadelphia, Pa.
- Jamar Co., Walker, Duluth, Minn.
- Johnson Fan & Blower Corp., Chicago, Ill.
- Jordan & Co., Paul R., Indianapolis, Ind.
- Kernchen Co., Chicago, Ill.
- Lau Blower Co., Dayton, O.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Mohler Co., J. K., Ephrata, Pa.
- Myers Electric Co., Pittsburgh, Pa.
- New York Blower Co., Chicago, Ill.
- Penn Ventilating Co., Philadelphia, Pa.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Reed Unit-Fans, Inc., New Orleans, La.
- Robertson Co., H. H., Pittsburgh, Pa.
- Royal Ventilator Co., Philadelphia, Pa.
- Russell Insulation Co., F. C., Cleveland, O.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Trade-Wind Motor Fans, Inc., Los Angeles, Cal.
- Uno Ventilator Co., Cliftondale, Mass.
- Viking Air Conditioning Corp., Cleveland, O.
- Western Engineering & Mfg. Co., Los Angeles, Cal.
- Wing Mfg. Co., L. J., New York City.

## VENTILATORS, ROOF, GRAVITY

- Accurate Mfg. Works, Chicago, Ill.
- Aeolus Dickinson, Chicago, Ill.
- Airtherm Mfg. Co., St. Louis, Mo.
- Allen Corp., Detroit, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- American-Larson Ventilating Co., Pittsburgh, Pa.
- American Sheet Metal Works, New Orleans, La.
- Ames Co., W. R., San Francisco, Cal.
- Anderson Mfg. Co., Des Moines, Ia.
- Arex Co., Chicago, Ill.
- Berger Bros. Co., Philadelphia, Pa.
- Burt Mfg. Co., Akron, O.
- California Cornice, Steel & Supply Corp., Los Angeles.
- Century Fan & Ventilator Corp., New York City.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Clay Equipment Corp., Cedar Falls, Ia.
- Danzer Metal Works Co., Hagerstown, Md.
- Day Co., The, Minneapolis, Minn.
- Decatur Iron & Steel Co., Decatur, Ala.
- Economy Electric Mfg. Co., Cicero, Ill.
- Edwards Mfg. Co., Inc., Cincinnati, O.
- Falstrom Co., Passaic, N. J.
- Fingles, Inc., W. A., Baltimore, Md.
- General Sheet Metal Works, Inc., Bridgeport, Conn.
- Globe Ventilator Co., Troy, N. Y.
- Goethel Co., Alfred C., Milwaukee, Wis.
- Hirschman Co., Inc., W. F., Buffalo, N. Y.
- Howes Co., S. M., Charlestown, Boston, Mass.
- Hudson Equipment Corp., Minneapolis, Minn.

- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- International Steel Co., Evansville, Ind.
- Iona Ventilator Co., Inc., Philadelphia, Pa.
- Iwan Brothers, South Bend, Ind.
- Jamar Co., Walker, Duluth, Minn.
- Jordan & Co., Paul R., Indianapolis, Ind.
- Kernchen Co., Chicago, Ill.
- King Ventilating Co., Owatonna, Minn.
- Kleenaire Corp., Stevens Point, Wis.
- LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
- Lamneck Products, Inc., Columbus, O.
- Lee & Son Co., Thomas, Cincinnati, O.
- Levow, David, New York City.
- Martin Metal Mfg. Co., Wichita, Kan.
- Mellish & Murray Co., Chicago, Ill.
- Merchant & Evans Co., Philadelphia, Pa.
- Meyer & Bro. Co., F., Peoria, Ill.
- Midwest Ventilating Works, Milwaukee, Wis.
- Milcor Steel Co., Milwaukee, Wis.
- Novy Ventilator Mfg. Co., Muskogee, Okla.
- Park City Cornice Works, Inc., Bridgeport, Conn.
- Patten Co., J. V., Sycamore, Ill.
- Penn Ventilating Co., Philadelphia, Pa.
- Perkins & Brown, Chicago, Ill.
- Providence Cornice Co., Providence, R. I.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Racine Sheet Metal Works, Racine, Wis.
- Robertson Co., H. H., Pittsburgh, Pa.
- Royal Ventilator Co., Philadelphia, Pa.
- Ryniker Sheet Metal Works, Inc., Billings, Mont.
- St. Paul Corrugating Co., St. Paul, Minn.
- Schoedinger Co., F. O., Columbus, O.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Southern States Iron Roofing Co., Savannah, Ga.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Swartwout Co., Cleveland, O.
- Tierney Rotor Ventilator Co., Minneapolis, Minn.
- Tiffin Art Metal Co., Tiffin, O.
- Uno Ventilator Co., Cliftondale, Mass.
- Van Noorden Co., E. Boston, Mass.
- Western Engineering & Mfg. Co., Los Angeles.
- Willis Mfg. Co., Galesburg, Ill.
- York Corrugating Co., York, Pa.

## WARM AIR REGISTER SHIELDS

*See Shields, Warm Air Register*

## WASHERS, AIR, FURNACE

- Air Conditioning Equipment Corp., Minneapolis, Minn.
- Aladdin Heating Corp., Oakland, Cal.
- American Furnace Co., St. Louis, Mo.
- Ames Co., W. R., San Francisco, Cal.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Belanger Fan & Oven Co., Detroit.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Brundage Co., Kalamazoo, Mich.
- Campbell Heating Co., Des Moines, Ia.
- Columbus Heating & Ventilating Co., Columbus, O.
- Economy Baler Co., Ann Arbor, Mich.
- Furblo Co., Hermansville, Mich.
- Gehri Co., Tacoma, Wash.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Handelan Washed Air Company, Minneapolis, Minn.
- Hoersting & Holtmann Co., Dayton, O.
- Jackson & Church Co., Saginaw, Mich.
- Kelsey Heating Co., Syracuse, N. Y.
- Lau Blower Co., Dayton, O.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Spencer Air Conditioning Service, Denver, Colo.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Western Blower Co., Seattle, Wash.

## WASHERS, AIR, HEATING AND VENTILATING (Capacity 4,000 c.f.m. and up)

- American Blower Corp., Detroit, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- Ames Co., W. R., San Francisco, Cal.
- Autovent Fan & Blower Co., Chicago, Ill.
- Bayley Blower Co., Milwaukee, Wis.
- Belanger Fan & Oven Co., Detroit.
- Betz Air Conditioning Corp., Kansas City, Mo.
- Bishop & Babcock Mfg. Co., Cleveland, O.
- Blower Application Co., Milwaukee, Wis.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo, N. Y.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Clarage Fan Co., Kalamazoo, Mich.
- Columbus Heating & Ventilating Co., Columbus, O.

● Advertisement in this issue. See Index to Advertisers, page 168.



- Electrovent Fan & Mfg. Co., Chicago, Ill.
- Furblo Co., Hermansville, Mich.
- Industrial Sheet Metal Works, Inc., Detroit, Mich.
- King Ventilating Co., Owatonna, Minn.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Mellish & Murray Co., Chicago, Ill.
- Mercoid Corp., Chicago.
- New York Blower Co., Chicago, Ill.
- Northern Blower Co., Cleveland, O.
- Parks-Cramer Co., Fitchburg, Mass.
- Peterson Freezem Mfg. & Sales Co., Kansas City, Mo.
- Spray-Wheel Air Conditioners, Inc., Denver, Colo.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Supreme Heater & Ventilating Corp., St. Louis, Mo.
- Trane Co., La Crosse, Wis.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utica Radiator Corp., Utica, N. Y.
- Utility Fan Corporation, Los Angeles, Cal.
- Western Blower Co., Seattle, Wash.
- York Ice Machinery Corp., York, Pa.

## WATERPROOFING

- Chase Brass & Copper Co., Waterbury, Conn.
- Cheney Co., Philadelphia.
- Sisalkraft Co., Chicago, Ill.

## WATER HEATERS

*See Coils, Fire Pot, Hot Water*

## WEATHER STRIPS, METAL

- Accurate Metal Weather Strip Co., New York City.
- Allmetal Weatherstrip Co., Chicago, Ill.
- American Metal Weather Strip Co., Grand Rapids, Mich.
- Athey Co., Chicago, Ill.
- Burrowes Corp., Portland, Me.
- Chamberlin Metal Weather Strip Co., Detroit, Mich.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Diamond Metal Weather Strip Co., Columbus, O.
- Ideal Metal Weather Strip Co., Boulder, Colo.
- Jamar Co., Walker, Duluth, Minn.
- Johnson Metal Products Co., Erie, Pa.
- Kane Mfg. Corp., Kane, Pa.
- Metal Products Co., Cincinnati, O.
- Monarch Metal Weatherstrip Corp., St. Louis, Mo.
- Newman Brothers, Inc., Cincinnati, O.
- Northern Weatherstrip Co., Duluth, Minn.
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
- Vento Steel Sash Co., Muskegon, Mich.
- Yardley Screen & Weather Strip Co., Columbus, O.

## WELDERS, ARC

- Alter-Arc Mfg. Co., Lawton, Okla.
- Burke Electric Co., Erie, Pa.
- Commonwealth Mfg. Corp., Cincinnati, O.
- Crise Electric Mfg. Co., Mt. Vernon, O.
- Elslar Engineering Co., Newark, N. J.
- Electric Arc Cutting & Welding Co., Newark, N. J.
- General Equipment Co., Wichita, Kan.
- General Electric Co., Schenectady, N. Y.
- Giant Grip Mfg. Co., Oshkosh, Wis.
- Hammett Mfg. Co., Kansas City, Mo. (A. C.)
- Hampton Elec. Tool Co., Pittsburgh, Pa.
- Harnischfeger Corp., Milwaukee, Wis.
- Hobart Brother Co., Troy, O.
- Lee & Son Co., K. O., Aberdeen, S. D.
- Lincoln Electric Co., Cleveland, O.
- Maple Valley Mfg. Co., Mapleton, Ia.
- Marquette Mfg. Co., Inc., Minneapolis, Minn.
- Master Welders, Kansas City, Mo. (A. C.)
- Miller Electric Mfg. Co., Inc., Appleton, Wis. (Portable)
- Ohio Welder Co., Middlefield, O.
- Pier Equipment Manufacturing Co., Benton Harbor, Mich.
- Smith Welding Equipment Corp., Minneapolis, Minn.
- Star Electric Motor Co., Bloomfield, N. J.
- Thomson-Gibb Electric Welding Co., Lynn, Mass.
- Trindl, Inc., Jos. H., Chicago.
- Una Welding, Inc., Cleveland, O.
- Universal Power Corp., Cleveland, O.
- Weldex, Inc., Detroit, Mich.
- Welding Apparatus Co., Chicago, Ill.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Will-Weld Mfg. Co., Inc., Omaha, Nebr. (A. C.)
- Wilson Welder & Metals Co., Inc., New York City.

## WELDERS, SPOT

- Acme Electric Welder Co., Huntington Park, Cal.
- Agnew Electric Welder Co., Milford, Mich.

- Canatsey Electric Manufacturing Co., Kansas City, Mo.
- Commonwealth Mfg. Corp., Cincinnati, O.
- Dyer Welder & Engineering Co., Kansas City, Mo.
- Elslar Engineering Co., Newark, N. J.
- Electric Arc Cutting & Welding Co., Newark, N. J.
- Federal Machine & Welder Co., Warren, O.
- General Electric Co., Schenectady, N. Y.
- Glascok Bros. Mfg. Co., Muncie, Ind.
- Hammett Manufacturing Co., Kansas City, Mo. (Portable).
- Micro Products Co., Chicago, Ill.
- Miller Electric Mfg. Co., Inc., Appleton, Wis.
- Pier Equipment Manufacturing Co., Benton Harbor, Mich. (Foot operated and motor driven.)
- Taylor-Hall Welding Corp., Worcester, Mass.
- Taylor-Winfield Corp., Warren, O. (Butt and Seam)
- Thomson-Gibb Electric Welding Co., Lynn, Mass.
- Universal Power Corp., Cleveland.
- Westinghouse Electric & Manufacturing Co., East Pittsburgh.

## WELDING EQUIPMENT, OXY-ACETYLENE

- Air Reduction Sales Co., New York City.
- Automatic Gasflux Co., Cleveland, O.
- Bastian-Blessing Co., Chicago, Ill.
- Burdett Mfg. Co., Chicago, Ill.
- Carbo-Oxygen Co., Pittsburgh, Pa.
- Gasweld Equipment Co., Chicago, Ill.
- Harris Calorific Co., Cleveland, O.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Insto-Gas Corporation, Detroit, Mich.
- Linde Air Products Co., New York City.
- Milburn Co., Alexander, Baltimore, Md.
- Modern Engineering Co., St. Louis, Mo.
- Smith Welding Equipment Corp., Minneapolis, Minn.
- Torchweld Equipment Co., Chicago, Ill.
- Victor Equipment Co., Los Angeles, Cal.
- Welding Apparatus Co., Chicago, Ill.

## WELDING ROD

*See Rod, Welding*

## WELDING TORCHES

*See Torches, Brazing, Cutting, Welding*

## WHEELS, BLOWER

- Advance Aluminum Castings Corp., Chicago, Ill.
- Air Controls, Inc., Cleveland, O.
- American Blower Corp., Detroit, Mich.
- Autovent Fan & Blower Co., Chicago, Ill.
- Bayley Blower Co., Milwaukee, Wis.
- Buffalo Forge Co., Buffalo, N. Y.
- Champion Blower & Forge Co., Lancaster, Pa.
- Clarage Fan Co., Kalamazoo, Mich.
- Economy Electric Manufacturing Co., Cicero, Ill.
- Furblo Co., Hermansville, Mich.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Janette Mfg. Co., Chicago, Ill.
- Lau Blower Co., Dayton, O.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Sturtevant Co., B. F., Hyde Park, Boston, Mass.
- Torrington Mfg. Co., Torrington, Conn.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- Utility Fan Corporation, Los Angeles, Cal.
- Viking Air Conditioning Corp., Cleveland, O.

## WINDOWS, HEAT INSULATING

- Detroit Steel Products Co., Detroit, Mich.
- Libbey-Owens-Ford Glass Co., Toledo, O.
- Russell Insulation Co., F. C., Cleveland, O.
- Truscon Steel Co., Youngstown, O.

## WINDOWS, HOLLOW METAL

- American Sheet Metal Works, New Orleans, La.
- Biersach & Neidermeyer Co., Milwaukee, Wis.
- Herrmann & Grace Co., Brooklyn, N. Y.
- International Steel Co., Evansville, Ind.
- Newman Brothers, Inc., Cincinnati, O.
- Perkinson & Brown, Chicago, Ill.
- Providence Cornice Co., Providence, R. I.
- Russell Insulation Co., F. G., Cleveland, O.
- Truscon Steel Co., Youngstown, O.
- Willis Mfg. Co., Galesburg, Ill.

• Advertisement in this issue. See Index to Advertisers, page 168.

## WIRE, PLAIN, GALVANIZED AND COPPERED

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)  
 American Nickeloid Co., Peru, Ill. (Chrome, nickel coated)  
 American Steel & Wire Co., Chicago, Ill.  
 Berger Mfg. Div. Republic Steel Corp., Canton, O.  
 Bethlehem Steel Co., Bethlehem, Pa. (Plain, galvanized)  
 California Wire Cloth Co., Oakland, Cal. (Cloth)  
 Carnegie-Illinois Steel Corp., Pittsburgh, Pa.  
 Central Steel & Wire Co., Chicago, Ill.  
 Chase Brass & Copper Co., Inc., Waterbury, Conn.  
 Chicago Steel & Wire Co., Chicago, Ill.  
 Columbia Steel Co., San Francisco, Cal.  
 Continental Steel Corp., Kokomo, Ind. (Plain, galvanized steel)  
 Copperweld Steel Co., Glassport, Pa. (Copper covered steel)

General Electric Co., Schenectady, N. Y.  
 Gulf States Steel Co., Birmingham, Ala.  
 Jones & Laughlin Steel Corp., Pittsburgh, Pa.  
 Ludlow-Saylor Wire Co., St. Louis, Mo. (Cloth)  
 Page Steel & Wire Co., Monessen, Pa.  
 ● Republic Steel Corp., Cleveland, O. (Steel)  
 Roebling's Sons Co., John A., Trenton, N. J.  
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
 Townsend Co., New Brighton, Pa. (Plain and coppered)  
 United States Steel Corp., Pittsburgh, Pa.  
 Western Wire & Iron Works, Inc., Chicago, Ill.  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling, W. Va.  
 Wickwire Spencer Steel Co., New York City.  
 ● Youngstown Sheet & Tube Co., Youngstown, O.

Section of  
**American Artisan**  
 1939 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL  
 AIR CONDITIONING AND SHEET METAL PRODUCTS  
 [Section 2—TRADE NAMES]

**A**

**ABC**—Fan Bearings, Ventilators. American Blower Corp., Detroit, Mich.  
**ABC**—Oil Burners. Automatic Burner Corp., Chicago, Ill.  
**AC**—Blowers, Blower Wheels. Air Controls, Inc., Cleveland, O.  
**A. C. S.**—Furnace Humidifier. Air Conditioning Supply Co., Cleveland, O.  
**AGP**—Furnaces and Gas Conversion Burners. American Gas Products Div., American Radiator Co., New York City.  
**A-F**—Controls, Humidistats, Motors, Regulators, Thermostats, Valves. Automatic Products Co., Milwaukee, Wis.  
**Able**—Waterproofing Compounds. American Barlock Co., Inc., Long Island City, N. Y.  
**Abra-soweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Acco-Eastic**—Caulking Compounds. Accurate Metal Weather Strip Co., New York, N. Y.  
**Ace**—Mallets. Fowler-Pem Co., Emeryville, Cal.  
**Ace**—Arc and Spot Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.  
**Acidseal**—Paint. B. F. Goodrich Co., Akron, O.  
**Acousti-Pad**—Insulation. Burgess Battery Co., Chicago, Ill.  
**Aeracool**—Fan Blades, Fans, Louvers, Ventilators. Myers Electric Co., Pittsburgh, Pa.  
**Aeratherm**—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
**Activ-Air**—Air Conditioning Furnaces. Heil Co., Milwaukee, Wis.  
**Activ-Flame**—Oil Burners. Heil Co., Milwaukee, Wis.  
**Aerisweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Aerocrat**—Blowers and Blower Units, Fans, Furnaces, Louvers, Washers. W. R. Ames Co., San Francisco, Cal.  
**Aerofelt**—Duct Insulation. Johns-Manville, New York City.  
**Aeropel**—Kitchen Exhaust Fans. American Blower Corp., Detroit, Mich.  
**Aeroplane**—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.  
**Aeroplex**—Blowers. Bayley Blower Co., Milwaukee, Wis.  
**Aeropull**—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.  
**Aerospot**—Fans. South Bend Air Products, Inc., South Bend, Ind.  
**Aerovalue**—Ventilators. Knowles Mushroom Ventilator Co., New York, N. Y.  
**Afco**—Furnaces. American Furnace Co., St. Louis, Mo.  
**Afco**—Dampers, Grilles, Louvers, Quadrants, Registers. American Foundry & Furnace Co., Bloomington, Ill.  
**Agathon**—Plates and Sheets. Republic Steel Corp., Cleveland, O.

**Air-Acoustic**—Insulation. Johns-Manville, New York City.  
**Airate**—Fans and Ventilators. Air Controls, Inc., Cleveland.  
**Airco**—Welding Rods. Air Reduction Sales Co., New York.  
**Airco-DE**—Torches and Welding Equipment. Air Reduction Sales Co., New York, N. Y.  
**Air-Con**—Heating & Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.  
**Air-Ray-Ator**—Air Conditioning Oil-Burning Furnaces. Ray Oil Burner Co., San Francisco, Cal.  
**Airez**—Air Conditioning Units, Blowers and Fans. Mountain States Equipment Co., Denver, Colo.  
**Air-Flo**—Dampers and Ventilators. Belanger Fan & Oven Co., Detroit.  
**Air-Flo**—Blower Units and Furnaces. Lennox Furnace Co., Marshalltown, Iowa.  
**Airfo**—Furnaces. Aladdin Heating Corp., Oakland, Cal.  
**Airfoil**—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.  
**Airguide**—Hygrometers and Thermometers. Fee & Stemwedel, Inc., Chicago, Ill.  
**Airite**—Furnaces. Trane Co., La Crosse, Wis.  
**Airklesner**—Furnaces. Round Oak Co., Dowagiac, Mich.  
**Airline**—Furnaces. Joliet Heating Corp., Joliet, Ill.  
**Airline**—Registers & Grilles. Tuttle & Bailey, Inc., New Britain, Conn.  
**Air-Marvels**—Desert Coolers and Fans. General Blower Co., Philadelphia, Pa.  
**Airmaster**—Air Conditioning Units. Thatcher Co., Newark, N. J.  
**Airmat**—Filters. American Air Filter Co., Inc., Louisville, Ky.  
**Airmoistener**—Register Shield with humidifier. Patent Novelty Co., Fulton, Ill.  
**Airnoil**—Oil Burners. American Oil Burners & Heating Utilities, Brooklyn, N. Y.  
**Air-O-Mist**—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.  
**Air-Pak**—Blower-Filter Units. Air Controls, Inc., Cleveland.  
**Airplex**—Filters. Davies Air Filter Corp., New York, N. Y.  
**Airpyrator**—Blowers. Burnwell Corp., Allentown, Pa.  
**Airseal**—Insulation. Rock Wool Products Co., Inc., Wabash, Ind.  
**Airvule**—Concrete Waterproofing Paint. Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.  
**Ajax**—Pipe, Roofing. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
**Akron**—Air Blast Furnaces. May-Fie-beger Co., Newark, Ohio.  
**Alabama**—Ventilators. Decatur Iron & Steel Co., Decatur, Ala.  
**Alaska**—Collis. Star Radiator Co., Los Angeles, Cal.

**Alco**—Roof Ventilators. Allen Corp., Detroit, Mich.  
**Alcoa**—Aluminum Products. Aluminum Co. of America, Pittsburgh, Pa.  
**Algias**—Skylights. American Barlock Co., Inc., Long Island City, N. Y.  
**Alladin**—Arc Welders. Commonwealth Mfg. Co., Cincinnati, O.  
**Allegheny**—Air Conditioning Furnaces. Pittsburgh Furnace Parts Co., Pittsburgh, Pa.  
**Allkots**—Paint. Acme Refining Co., Cleveland.  
**All-Season**—Directional Flow Register. Eckenroth Register Co., San Francisco, Cal.  
**All-Sol**—Flux. L. B. Allen Co., Chicago.  
**Alma**—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.  
**Almar**—Corner Lock Forming Machine. Ward Machinery Co., Chicago, Ill.  
**Almetal**—Fire Doors. Merchant & Evans Co., Philadelphia, Pa.  
**Alnor**—Thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.  
**Alumbrite**—Paint. Thompson & Co., Pittsburgh, Pa.  
**Alumi-Flux**—Soldering Flux. L. B. Allen Co., Chicago, Ill.  
**Alumilite**—Aluminum Venetian Blinds. Chicago Venetian Blind Co., Chicago.  
**Aluminweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Alumi-Soda**—Soldering Flux. L. B. Allen Co., Chicago.  
**Always Reliable**—Soldering Furnaces, Torches. Otto Bernz Co., Inc., Rochester, N. Y.  
**Ambrac**—Sheets, Welding Rod. American Brass Co., Waterbury, Conn.  
**Amco**—Flux. American Solder & Flux Co., Philadelphia, Pa.  
**Amco**—Nozzles. Grinnell Co., Inc., Providence, R. I.  
**American**—Draft Gages. Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.  
**American**—Furnaces. Ryniker Sheet Metal Works, Inc., Billings, Mont.  
**American**—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.  
**American**—Temperature Recorders. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.  
**American Heat Hustler**—Climate-maker Corporation, Nashville, Tenn.  
**Amirglass**—Air Filters. Amirton Co., New York City.  
**Am-Pe-Co**—Blower Units. American Machine Products Co., Marshalltown, Iowa.  
**Anaconda**—Copper and Brass Products. American Brass Co., Waterbury, Conn.  
**Anchor**—Furnaces, Oil Burners. Fargo Foundry Co., Fargo, N. D.  
**Anchor**—Roofing Nails. W. H. Maze Co., Peru, Ill.  
**Anchor**—Roofing Paint. A. Wilhelm Co., Reading, Pa.



**Anchor Brand**—Nails, Rivets. Townsend Co., New Brighton, Pa.  
**Anderson**—Spray Nozzles. B. F. Sturtevant Co., Hyde Park, Mass.  
**Anode**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Anti-Pluvius**—Skylights. G. Drouve Co., Fairfield, Conn.  
**Apco**—Caulking Compounds, Paint. Asphalt Products Co., Syracuse, N. Y.  
**Apex**—Dampers, Quadrants. Ohio Products Co., Cleveland, O.  
**Apex**—Hangers. Elbows and Fittings. Royal-Apex Mfg. Corp., Brooklyn.  
**Apollo**—Roofing. Carnegie-Illinois Steel Co., Pittsburgh, Pa.  
**Appoloy**—Copper Steel. Apollo Steel Company, Apollo, Pa.  
**Aqua Bar**—Roof Cement. Continental Products Co., Euclid, O.  
**Arc-Eng**—Air Conditioning Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.  
**Arco**—Air Conditioning Units, Air Filters, Cleaners, Fans, Copper Tubing. American Radiator Co., New York, N. Y.  
**Arcoflame**—Oil Burners. American Radiator Co., New York City.  
**Arco-Vecto**—Heaters. American Radiator Co., New York, N. Y.  
**Ardent**—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.  
**Arlin**—Louvers. Arco Co., Chicago, Ill.  
**Aristocrat**—Fans. Torrington Mfg. Co., Torrington, Conn.  
**Aristocrat**—Registers. Auer Register Co., Cleveland, O.  
**Armco**—Plates, Sheets. American Rolling Mill Co., Middletown, O.  
**Armorize**—Paint. Carter Paint Co., Liberty, Ind.  
**Armstrong**—Compressors. General Machinery Co., Spokane, Wash.  
**Arrow**—Ventilators. Uno Ventilator Co., Cliftondale, Mass.  
**Art**—Shingles. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.  
**Artcraft**—Furnace Blowers. Chicago Steel Furnace Co., Chicago, Ill.  
**Asco**—Relays, Switches, Valves. Automatic Switch Co., New York, N. Y.  
**Aspro**—Water-proofing Paint. Asphalt Products Co., Syracuse, N. Y.  
**Ath-A-Nor**—Furnaces. May-Flebege Co., Newark, Ohio.  
**Atomist**—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.  
**Au-Temp-Co**—Controls, humidistats, motors, regulators, relays, switches, thermostats. Automatic Temperature Control, Inc., New York City.  
**Automatic**—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.  
**Automatic Butler**—Stokers. Butler Mfg. Co., Kansas City, Mo.  
**Automatic Drip**—Humidifiers. Automatic Humidifier Co., Cedar Falls, Iowa.  
**Automatic June**—Humidifiers, Valves. Monmouth Products Co., Cleveland.  
**Automatic Water-Tender**—Humidifier. Valves. Air Conditioning Supply Co., Cleveland, Ohio.  
**Automatik**—Furnaces. Premier Furnace Co., Dowagiac, Mich.

## B

**BB**—Blast Gates, Fittings, Roof Clips, Snow Guards and Accessories. Berger Bros. Co., Philadelphia, Pa.  
**BC**—Closet-Type Gas-Fired Air Conditioning Unit. Surface Combustion Corp., Toledo, Ohio.  
**B. F. C.**—Gas Burners. Moncrief Furnace & Mfg. Co., Dallas, Tex.  
**B-E**—Insulating Cement. Baldwin-Hill Co., Trenton, N. J.  
**B-W**—Relays, Switches. Bender Warrick Corp., Birmingham, Mich.

**Badger**—Machines, Metal Workers' Tools, Pumps. Rock River Machine Co., Inc., Janesville, Wis.  
**Ball Bearing**—Damper Quadrants. Parker-Kalon Co., New York, N. Y.  
**Balmi-Aire**—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis.  
**Bankheat**—Oil Burners. S. T. Johnson Co., Oakland, Cal.  
**Barcol**—Controls, Motors, Thermostats. Barber-Colman Co., Rockford, Ill.  
**Barry**—Couplings, Pulleys. R. & J. Dick Co., Inc., Passaic, N. J.  
**Barton**—Heat Savers. Industrial Sheet Metal Works, Inc., Detroit.  
**Barton**—Gas and Oil Burners, Air Conditioning and Gravity Furnaces. National Mfg. & Engineering Co., Detroit, Mich.  
**Beautyheater**—Cabinet-type Circulating Heaters. Odin Stove Mfg. Co., Erie, Pa.  
**Beaver**—Furnaces and Heaters. Danville Stove & Mfg. Co., Danville, Pa.  
**Beehive**—Roofing. Samuel Cabot, Inc., Boston, Mass.  
**Beldt**—Machines, Punches, Tools. Hendley & Whittmore Co., Beloit, Wis.  
**Bemis**—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.  
**Benco**—Oil Burners. Bennett Co., Omaha, Nebr.  
**Benefactor**—Furnaces. Hess Warming & Ventilating Co., Chicago, Ill.  
**Bengal**—Furnaces, Heaters. Floyd-Wells Co., Royersford, Pa.  
**Bennett-Allison**—Oil Burners. Bennett Co., Omaha, Nebr.  
**Berloy**—Building Products. Berger Mfg. Co., Div. Republic Steel Corp., Canton, O.  
**Berry-Col**—Insulation. F. E. Berry & Co., Everett, Mass.  
**Bertossa**—Air Conditioning and Warm Air Furnaces. Jackson & Church Co., Saginaw, Mich.  
**Beth-Cu-Loy**—Sheets. Bethlehem Steel Co., Bethlehem, Pa.  
**Bethlehem Doe**—Oil Burners. Bethlehem Fdy. & Mach. Co., Bethlehem, Pa.  
**Bettendorf**—Oil Burners and Stokers. Micro-Westco, Inc., Bettendorf, Iowa.  
**Big Sioux**—Furnaces. Iowa Foundry Co., Sioux City, Iowa.  
**Bildrite**—Building Insulation. Insulite Co., Minneapolis, Minn.  
**Black Diamond**—Built-up Roofing. Barrett Co., New York, N. Y.  
**Black Diamond**—Furnaces, Heaters. Maple City Furnace Co., Monmouth, Ill.  
**Black Diamond**—Stokers. Beckley Perforating Co., Garwood, N. J.  
**Blo-Aire**—Blower Housings. Detroit Stamping Co., Detroit.  
**Blo-Matic**—Stokers. Her-Born Engineering & Mfg. Co., Sandusky, O.  
**Blue Knight**—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Elizabeth, N. J.  
**Boiler Plate**—Furnaces. Williamson Heater Co., Cincinnati, O.  
**Bon-Air**—Blower Units, Furnaces. Rudy Furnace Co., Dowagiac, Mich.  
**Boomer**—Furnaces, Heaters. Hess-Snyder Co., Massillon, O.  
**Boost-Aire**—Fans. L. J. Mueller Furnace Co., Milwaukee.  
**Branford**—Oil Burners. Malleable Iron Fittings Co., Branford, Conn.  
**Brees-Air**—Fans. Buffalo Forge Co., Buffalo, N. Y.  
**Brevolite**—Crackle Finish Paint. Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.  
**Brookcell**—Metal Ceilings. Brooklyn Metal Ceiling Co., Brooklyn, N. Y.  
**Brown**—Humidity and Temperature Recorders. Minneapolis-Honeywell Regulator Co., Minneapolis.  
**Bull Dog**—Snips and Shears. Wiss & Sons Co., Newark, N. J.

**Bung-Lo**—Floor and Warm Air Furnaces. Geo. J. Cocking, Santa Ana, Cal.  
**Burke**—Pumps. Decatur Pump Co., Decatur, Ill.  
**Butler**—Furnaces. Ramey Mfg. Co., Columbus, O.

## C

**C-E—Stokers**. Combustion Engineering Co., Inc., New York, N. Y.  
**C-E Coxe**—Stokers. Combustion Engineering Co., Inc., New York City.  
**C-E Skelly**—Stokers. Combustion Engineering Co., Inc., New York City.  
**C-H**—Relays, Switches and Valves. Cutler-Hammer, Inc., Milwaukee, Wis.  
**CID**—Pumps. Goulds Pumps, Inc., Seneca Falls, N. Y.  
**Cadet**—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.  
**Calcor**—Skylight Lifts. California Cor-nice, Steel and Supply Corp., Los Angeles.  
**Calliflex**—Thermostatic Bi-Metals. Callite Product Co., Union City, N. J.  
**Caloric**—Furnaces. Marshall Furnace Co., Marshall, Mich.  
**Calorider**—Summer Air Conditioning Units. Research Corp., New York, N. Y.  
**Calwico**—Wire Cloth. California Wire Cloth Co., Oakland, Cal.  
**Camel**—Valves. C. L. Bryant Corp., Cleveland, O.  
**Canon**—Stove and Furnace Repairs. Standard Foundry & Furnace Co., DeKalb, Ill.  
**Capital**—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.  
**Capitol**—Furnaces. United States Radiator Corp., Detroit, Mich.  
**Capitol**—Insulation. Standard Lime & Stone Co., Baltimore, Md.  
**Capitol**—Weather Strips. Diamond Metal Weather Strip Co., Columbus, O.  
**Capitolaire**—Blower-Filter Units, Furnaces. United States Radiator Corp., Detroit.  
**Carbonaire**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Careycel**—Insulation. Philip Carey Co., Cincinnati, Ohio.  
**Careyduet**—Prefabricated Ducts and Fittings. Philip Carey Co., Cincinnati, Ohio.  
**Carton Economy**—Furnaces. International Heater Co., Utica, N. Y.  
**Cascade**—Desert Coolers. Todd Air Conditioning Co., Inc., Bonner Springs, Kansas.  
**Case-Schaffer**—Furnaces. Western Furnaces, Inc., Tacoma, Wash.  
**Castalu**—Blower Wheels. Advance Aluminum Castings Corp., Chicago, Ill.  
**Caulk-O-Seal**—Caulking and Glazing Compounds. Calbar Paint & Varnish Co., Philadelphia, Pa.  
**Cel-Lux**—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.  
**Cementico**—Concrete Waterproofing Paint. United States Gypsum Co., Chicago.  
**Cementite**—Paint. Thompson & Co., Pittsburgh, Pa.  
**Cementkote**—Paint. Tropical Paint & Oil Co., Cleveland, O.  
**Cempro**—Concrete Paint. Asphalt Products Co., Syracuse, N. Y.  
**Challenge**—Furnaces. Standard Foundry & Furnace Co., DeKalb, Ill.  
**Challenger**—Stokers. Kol-Master Corp., Oregon, Ill.  
**Chamberlin**—Automatic Humidifier. Chandler Co., Cedar Rapids, Ia.  
**Charavay**—Blowers, Fans. Hartzell Propeller Fan Co., Piqua, O.

**Chevron**—Furnaces. Michigan Tank & Furnace Corp., Detroit.

**Chicago**—Brakes and Presses. Dreis & Krump Mfg. Co., Chicago, Ill.

**Chicastele Castable**—Refractory. Chicago Fire Brick Co., Chicago, Ill.

**Chico Brickset**—High Temperature Cement. Chicago Fire Brick Co., Chicago, Ill.

**Chief**—Furnaces. Joliet Heating Corp., Joliet, Ill.

**Chieftain**—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.

**Chieftain**—Refrigerating Compressors. Tecumseh Products Co., Tecumseh, Mich.

**Chinook**—Heating Colls. Bayley Blower Co., Milwaukee, Wis.

**Chinookin**—Heating Colls. Bayley Blower Co., Milwaukee, Wis.

**Christie**—Furnace Vacuum Cleaners. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

**Chromweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Chronat**—Furnace and Boiler Repairs. National Fdry. & Furnace Co., Dayton, O.

**Chronotherm**—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

**Cibulas**—Skylights, Ventilators. General Sheet Metal Works, Inc., Bridgeport, Conn.

**Circulator**—Fans and Ventilators. Viking Air Conditioning Corporation, Cleveland, O.

**Clamp On**—Humidifier Fittings. Sallada Mfg. Co., Minneapolis, Minn.

**Classic**—Registers. Auer Register Co., Cleveland, O.

**Cleanaire**—Blower-Filters. Peerless Foundry Co., Indianapolis, Ind.

**Climate-Changer**—Air Conditioning Units. Trane Co., La Crosse, Wis.

**Climate Control**—Desert Cooler. W. R. Ames Co., San Francisco.

**Climate Maker**—Air Conditioning Units. Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

**Climate Master**—Oil Burning Air Conditioning Furnace. Hess Warming & Ventilating Co., Chicago, Ill.

**Climator**—Blower Units, Washers. L. J. Mueller Furnace Co., Milwaukee.

**Clinscher**—Conductor Fittings and Accessories. Milcor Steel Co., Milwaukee.

**Clinton**—Grilles. Wickwire Spencer Steel Co., New York City.

**Coal Master**—Stoker-fired Furnace. Round Oak Co., Dowagiac, Mich.

**Cog-Belts**—V-type Belts. Dayton Rubber Mfg. Co., Dayton, Ohio.

**Colalloy**—Light Weight Shapes, Nails, Plates, Rivets, Welding Rod, Roofing and Sheets. Colonial Alloys Co., Philadelphia.

**Colonial**—Blower-Filters, Oil Burners, Furnaces, Humidifiers, Stokers. Green Foundry & Furnace Works, Des Moines, Iowa.

**Colonial**—Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn.

**Colonial**—Registers. Auer Register Co., Cleveland, O.

**Colortip**—Arc Welding Electrodes. Wilson Welder & Metals Co., Inc., New York City.

**Columbus**—Ventilators. F. O. Schoedinger Co., Columbus, O.

**Combustioneer**—Stokers. Steel Products Engineering Co., Springfield, O.

**Comet**—Fans, Ventilators. New York Blower Co., Chicago, Ill.

**Comfort**—Furnaces. J. B. Foote Foundry Co., Fredericktown, O.

**Comfort**—Furnaces. May-Fiebeger Co., Newark, Ohio.

**Comfort Air**—Blower-Filter Units. Home Comfort Co., Harvey, Ill.

**Comfortaire**—Stokers. Hamilton Automatic Stoker Corp., Hamilton, O.

**Comfortmaker**—Furnaces. Joliet Heating Corp., Joliet, Ill.

**Comfortrol**—Blowers and Blower Units, Furnaces, Washers. Waterman-Waterbury Co., Minneapolis.

**Comfortrol**—Effective Temperature Control. Julien P. Friez & Sons, Baltimore.

**Co-Min-Co**—Insulating Cement. U. S. Mineral Wool Co., Chicago.

**Compact**—Blowers. Bishop & Babcock Mfg. Co., Cleveland, O.

**Compact**—Oil Burners. The Aldrich Co., Peoria, Ill.

**Compactaire**—Air Conditioning Furnaces. Glasby Mfg. Co., Inc., J. P., Bloomfield, N. J.

**Compass**—Belts. Goodyear Tire & Rubber Co., Akron, O.

**Condor**—Belts. Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.

**Control-O-Gas**—Valves. Payne Furnace & Supply Co., Beverly Hills, Cal.

**Convactor**—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.

**Coolair**—Blowers, Fans. American Cool-air Corp., Jacksonville, Fla.

**Coolvent**—Attic Fans. Autovent Fan & Blower Co., Chicago.

**Coppercote**—Copper Paint. American Coppercote, Inc., Brooklyn, N. Y.

**Copperkote**—Waterproofing. Cheney Co., Philadelphia.

**Copperior**—Sheets. Superior Sheet Steel Co., Canton, O.

**Cop-B-Loy**—Copper Bearing Steel Sheets. Wheeling Corrugating Co. and Wheeling Steel Corp., Wheeling, W. Va.

**Corinco**—Insulation. Cork Insulation Co., Inc., New York, N. Y.

**Corkboard**—Insulation. Armstrong Cork Co., Lancaster, Pa.

**Coroaire**—Air Conditioning Furnaces and Heaters. Corozone Air Conditioning Corp., Cleveland, O.

**Crescent**—Furnaces. Green Foundry & Furnace Works, Des Moines, Iowa.

**Crescent**—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

**Crescent**—Oil Burners. Calorol Burner Corp., Hartford, Conn.

**Crescent**—Skylights, Ventilators. American Sheet Metal Works, New Orleans, La.

**Crescent**—Ventilators. F. Meyer & Bro. Co., Peoria, Ill.

**Crimpedge**—Eaves Trough, Gutters. Milcor Steel Co., Milwaukee, Wis.

**Crucibleweld**—Arc Welding Electrodes. Westinghouse Electric & Mfg. Co., East Pittsburgh.

**Crusader**—Oil Burners. Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.

**Cupro-Nickel**—Alloy Sheets. Reverse Copper and Brass Incorporated, New York City.

**Crystal**—Crackle Finish Paint. Hilo Varnish Corp., Brooklyn.

## D

**D&E**—Vacuum Furnace Cleaners, Stokers, Thermostats. Dickson & Eddy, New York City.

**D-Q**—Furnace Vacuum Cleaners. Densmore-Quinlan Co., Kenosha, Wis.

**Dallaire**—Blowers and Blower Units, Furnaces. Dall Steel Products Co., Lansing, Mich.

**Dakota**—Furnaces, Blowers. Fargo Foundry Co., Fargo, N. D.

**Daptobin**—Gas Burners. Beck Engineering Combustion Company, St. Louis.

**Decosol**—Aluminum Paint. Debevoise Co., Brooklyn, N. Y.

**Defecto**—Ventilators. The Day Co., Minneapolis, Minn.

**DeLuxe**—Air Conditioning Furnaces. Williamson Heater Co., Cincinnati.

**DeLuxe**—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

**DeLuxe**—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

**Dens-Pac**—Asbestos Cement. Norristown Magnesia & Asbestos Co., Norristown, Pa.

**Dependable**—Paint. Heath & Milligan Mfg. Co., Chicago, Ill.

**De-Pollenizer**—Window Ventilator and Filter Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

**Dereks**—Concrete Waterproofing Paint. Debevoise Co., Brooklyn, N. Y.

**Detroit LoStoker**—Stokers. Detroit Stoker Co., Detroit and Monroe, Mich.

**Detroit UniStoker**—Stokers. Detroit Stoker Co., Detroit and Monroe, Mich.

**Desert Cooler**—Evaporative Type Air Conditioning Unit. Utility Fan Corp., Los Angeles.

**Dial Damper**—Draft Regulators. Parker-Kalon Corp., New York City.

**Dial-Set**—Stokers. Kol-Master Corp., Oregon, Ill.

**Diamond**—Compounds. Thompson & Co., Pittsburgh, Pa.

**Diamond**—Smoke Pipe Dampers. Adams Co., Dubuque, Ia.

**Diamond H**—Relays, Switches. Hart Mfg. Co., Hartford, Conn.

**Dickinson**—Dampers, Scuppers, Ventilators. Aeolus Dickinson, Chicago, Ill.

**Dickrops**—V-type Belts. R. & J. Dick Co., Passaic, N. J.

**Directaire**—Air Conditioning Furnaces. Fitzgibbons Boiler Co., Inc., New York City.

**Doall Metalmaster**—Contour cutting saw. Continental Machine Specialties, Inc., Minneapolis.

**Double Diamond**—Humidistats, Psychrometers, Humidity and Temperature Recorders. Relays, Switches, Thermometers. H-B Instrument Company, Philadelphia, Pa.

**Double Duty**—Filters. Independent Air Filter Co., Chicago, Ill.

**Double-Duty**—Oil Burners. Aldrich Co., Peoria, Ill.

**Double Radiator**—Furnaces. Mueller Furnace Co., L. J., Milwaukee, Wis.

**Dover**—Hangers. Reeves Steel & Mfg. Co., Dover, Ohio.

**Dover-Imperial**—Eaves Trough Hangers. Ohio Wire Products Co., Dover, O.

**Dow**—Pipe. Sterling Foundry Co., Sterling, Ill.

**Dowagiac**—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

**Draftester**—Draft Gages. Cole-Sullivan Engineering Co., Minneapolis, Minn.

**Draftmaster**—Regulators. Platt Products Corp., Lansing, Mich.

**Draft-O-Stat**—Draft Regulators. Hotstream Heater Company, Cleveland.

**Drafrite**—Draft Gages. Bacharach Industrial Instrument Co., Pittsburgh.

**Dreadnaught**—Soldering Furnaces, Torches. P. Wall Mfg. Supply Co., Pittsburgh, Pa.

**Dri-Lap**—Roofing. Globe Iron Roofing & Corrugating Co., Cincinnati, O.

**Dri-X-Tite**—Cement. A. C. Horn Co., Long Island City, N. Y.

**Drou-Ve-Lite**—Skylights. G. Drouve Co., Fairfield, Conn.

**Dryseal**—Asbestos Paint. Acorn Refining Co., Cleveland.

**Dual-Air**—Ventilators. General Regulator Corp., Chicago, Ill.

**Dual-Clone**—Blow Pipe Collectors. Day Co., Minneapolis.

**Duckseal**—Waterproofing Compound. Acorn Refining Co., Cleveland.

**Duco**—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.



**Dul-Kote**—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.  
**Dulox**—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.  
**Dunco**—Relays, Switches, Thermostats and Timers. Struthers Dunn, Inc., Philadelphia, Pa.  
**DuoTherm**—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.  
**Duplex**—Flashings. Chase Brass & Copper Co., Inc., Waterbury, Conn.  
**Dura**—Furnaces, Heaters. Barry Furnace Co., Hamilton, O.  
**Dura-Bilt**—Floor Registers and Cold Air Faces. Auer Register Co., Cleveland, Ohio.  
**Dur-A-Ble**—Furnaces. St. Louis Furnace Mfg. Co. St. Louis.  
**Duronze**—Sheets, Bridgeport Brass Co., Bridgeport, Conn.  
**Dura-Steel**—Faces and Registers. H. C. Middleton Mfg. Co., Minneapolis.  
**DustStop**—Filters. Owens-Corning Fiberglass Corp., Toledo, Ohio.  
**Dux-Bac**—Shingles. Milcor Steel Co., Milwaukee, Wis.  
**Dux-Sulation**—Insulation, Duct and Sound Deadening. Grant Wilson, Inc., Chicago, Ill.  
**Dynaflow**—Blowers. South Bend Air Products, Inc., South Bend, Ind.

## E

**E-R**—Soldering Furnace. American Gas Products Div. of American Radiator Co., New York City.  
**Eagle**—Air Filters. Felters Co., Inc., Boston.  
**Eagle Star**—Solder. Eagle-Picher Lead Co., Cincinnati, Ohio.  
**Eagle Super**—Insulating Cement and Flashing. Eagle-Picher Lead Co., Cincinnati, O.  
**Eagle Tin-Loy**—Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, Ohio.  
**Earle**—Ventilators. Berger Bros. Co., Philadelphia, Pa.  
**Easy Edger**—Flanging Machine. Ward Machinery Co., Chicago, Ill.  
**Easy-Flo**—Welding Rod. Handy & Harmon, New York, N. Y.  
**Easy-Slip**—Conductor Pipe, Eaves Trough and Gutters. La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.  
**Economy**—Furnaces, Heaters. International Heater Co., Utica, N. Y.  
**Economy**—Blow Pipe Hoods. Kirk & Blum Mfg. Co., Cincinnati, O.  
**Economy**—Registers. Auer Register Co., Cleveland, O.  
**Economy**—Stokers. Christensen Machine Co., Salt Lake City, Utah.  
**Edge Seal**—Filters. Wilson & Co., Inc., Chicago.  
**Edmanco**—Ceilings, Shingles, Sheet Metal Products. Edwards Mfg. Co., Inc., Cincinnati, O.  
**Effco**—Louvers, Skylights, Ventilators. W. F. Hirschman Co., Inc., Buffalo.  
**Ekoco**—Furnaces, Washers. E. K. Campbell Heating Co., Kansas City.  
**Elastikote**—Paint. Tropical Paint & Oil Co., Cleveland, O.  
**Elastite**—Bases and Pads. Philip Carey Co., Cincinnati.  
**El Dryol**—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.  
**Electric Furnace Man**—Domestic Stoker. General Machine Co., Inc., New York City.  
**Electric Janitor**—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.  
**Electro**—Sheet Roofing. American Brass Co., Waterbury, Conn.  
**Electrol-Air**—Air Conditioning Furnaces. Associated Air Conditioning Corp., St. Louis, Mo.

**Fyr-Fly**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Electro Way**—Fans. Ward Mfg. Co., Detroit, Mich.  
**Electro-Wind**—Ventilators. Allen Corp., Detroit.  
**Electrozone**—Ozonizers. Triox Eng. Co., St. Louis, Mo.  
**El Glykol**—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.  
**Elite**—Registers. Auer Register Co., Cleveland, O.  
**Emco**—Valves. Pittsburgh Equitable Meter Co., Pittsburgh, Pa.  
**Emerald Cord**—Belts. Goodyear Tire & Rubber Co., Akron, O.  
**Empire**—Mallets. Greene, Tweed & Co., New York City.  
**Enamelite**—Duct Insulation. Presstite Engineering Co., St. Louis, Mo.  
**Enduro**—Sheets. Republic Steel Corp., Cleveland, O.  
**Epcoc**—Perforated Metals. Erdle Perforating Co., Rochester, N. Y.  
**Equator**—Furnaces and Heaters. Lennox Furnace Co., Marshalltown, Iowa.  
**Esico**—Electric Soldering Coppers. Electric Soldering Iron Co., Inc., Deep River, Conn.  
**Eskimo**—Coils. Star Radiator Co., Los Angeles, Cal.  
**Eternit**—Cement and Insulation. Rubberoid Co., New York City.  
**Eternium**—Paint. Barrett Co., New York City.  
**Eureka**—Furnaces. Home Stove Co., Indianapolis, Ind.  
**Evansway**—Furnaces. George Evans Corp., Moline, Ill.  
**Evco**—Valves. Electric Valve Mfg. Co., New York, N. Y.  
**Everdur**—Plates, Sheets, Structural Shapes, Welding Rod. American Brass Co., Waterbury, Conn.  
**Everlast**—Furnaces. Pacific Gas Radiator Co., Los Angeles, Cal.

## F

**FAU**—Forced Air Furnace Unit. Payne Furnace & Supply Co., Beverly Hills, Cal.  
**F & E**—Underfeed Stokers. Flynn & Emrich Co., Baltimore, Md.  
**Fabrikated**—Faces, Grilles, Registers. Independent Register Co., Cleveland, O.  
**Fairweather**—Blowers and Blower Units, Washers. Furblo Co., Hermansville, Mich.  
**Falco**—Sheets. Fairmont Aluminum Co., Fairmont, W. Va.  
**Famous**—Oil Burners. Excelsior Steel Furnace Co., Chicago.  
**Farquaire**—Blower Units. Farquhar Furnace Co., Wilmington, O.  
**FarQuar**—Furnaces. Farquhar Furnace Co., Wilmington, O.  
**Favorite**—Furnace and Smoke Pipe Fittings and Accessories. Williamson Heater Co., Cincinnati, O.  
**Featherfin**—Coils. L. J. Wing Mfg. Co., New York, N. Y.  
**F Electric**—Fan Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.  
**Ferrobord**—Steel Roofing. Truscon Steel Co., Youngstown, Ohio.  
**Ferroclad**—Building Insulation. Truscon Steel Co., Youngstown, O.  
**Ferrocrafft**—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.  
**Ferro-Therm**—Insulation. American Flange & Mfg. Co., Inc., New York.  
**Ferroweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Fiberglas**—Cement and Insulation. Owens-Corning Fiberglass Corp., Toledo, Ohio.  
**Fibre-kote**—Asbestos Paint. National Mfg. Corp., Tonawanda, N. Y.  
**Filteraire**—Window Ventilator-filter units. Davies Air Filter Corp., New York City.  
**Filtered Aire**—Blowers and Blower Units. American Foundry & Furnace Co., Bloomington, Ill.  
**Findlay**—Stokers. Bluffton Mfg. Co., Findlay, O.  
**Fine Air**—Air Conditioning Units. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.  
**Firecrete**—Refractories. Johns-Manville, New York, N. Y.  
**Firehammer**—Draft Regulators. Wisconsin Heating & Draft Control Co., Oshkosh, Wis.  
**Fireite**—Cement. Johns-Manville, New York, N. Y.  
**Fire-King**—Stokers. Sinker-Davis Co., Indianapolis, Ind.  
**Fire Tender**—Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.  
**Firma**—Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.  
**Fitchburg**—Oil Burners. E. W. Skinner Co., Fitchburg, Mass.  
**Fitrite**—Conductor, Eaves Trough and Gutter Fittings and Accessories, Skylight Lifts, Ventilators. David Levow, New York, or Rival Strap Corp., New York City.  
**Fitrite**—Snow Guards. David Levow, New York City.  
**Fitzgibbonsaire**—Air Conditioning Unit. Fitzgibbons Boiler Co., Inc., New York City.  
**Fixit**—Cement. National Mfg. Corp., Tonawanda, N. Y.  
**Fleetweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Flour de Lis**—Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.  
**Flexair**—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.  
**Flexarc**—Arc Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh.  
**Flo-Co**—Furnaces. Floral City Co., Monroe, Mich.  
**Floeszy**—Solder. Merchant & Evans Co., Philadelphia, Pa.  
**Flor-Aire**—Floor Furnaces. L. J. Mueller Furnace Co., Milwaukee.  
**Florence**—Furnaces. Emrich Co., Inc., Columbus, Ohio.  
**Flossol**—Flux. American Chemical Paint Co., Ambler, Pa.  
**Flo-Warm**—Coal, Oil, Gas and Stoker-Fired Furnaces. Williamson Heater Co., Cincinnati, Ohio.  
**Forbes Syphonaire**—Ventilators. Western Engineering & Mfg. Co., Los Angeles.  
**Forbes Tri-Peller**—Fans. Western Engineering & Mfg. Co., Los Angeles.  
**Forest Fleece**—Insulation. John J. Doeheny Co., Belmont, Mass.  
**Forstair**—Circulating Heaters. Pernot & Rich, Inc., Los Angeles.  
**Fosco**—Cornices, Metal Ceilings, Skylights, etc. F. O. Schoedinger Co., Columbus, O.  
**Franklin**—Stokers. Columbus Metal Products, Inc., Columbus, O.  
**Freeflo**—Grilles. Trane Co., LaCrosse, Wis.  
**Free-Man**—Stokers. Illinois Iron & Bolt Co., Chicago, Ill.  
**Freeport**—Oil Burners. Holtum Mfg. Co., Freeport, Ill.  
**Freezem**—Blowers. Peterson Freezem Mfg. Co., Kansas City, Mo.  
**Front End**—Paint. Barrett Co., New York, N. Y.  
**Front Rank**—Furnaces. Liberty Foundry Co., St. Louis, Mo.  
**Fuelsaver**—Stokers. Morse Chain Co., Ithaca, N. Y.



**Fulton**—Copper Paint. Debevoise Co., Brooklyn, N. Y.  
**Fyr-feeder**—Stokers. American Coal Burner Company, Chicago, Ill.

## G

**G. B. S.**—Blowers. General Blower Co., Philadelphia.  
**G. E.**—Air Conditioning Units, Controls, Motors, Welders. General Electric Co., New York City and Schenectady.  
**G-F-K**—Gas Conversion Burners. Sioux City Foundry and Boiler Co., Sioux City, Iowa.  
**G-M**—Faces, Grilles, Louvres, Shutters, Perforated Metals, Registers, Register Shields, Metal Stampings, Ventilators. Gillian Mfg. Co., Ferndale, Mich.  
**Gale**—Oil Burners, Cabinets, Ducts, Fittings, Accessories. Char-Gale Mfg. Co., Minneapolis, Minn.  
**Garland**—Furnaces, Heaters, Repairs. Detroit-Michigan Stove Co., Detroit.  
**Garrick**—Regulators. Hays Corp., Michigan City, Ind.  
**Gas-Hra**—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.  
**Gastite**—Furnaces. Waterman - Waterbury Co., Minneapolis, Minn.  
**Gem**—Furnaces. Robinson Furnace Co., Chicago, Ill.  
**Gem**—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.  
**Gemanco**—Compressors. General Machinery Co., Spokane, Wash.  
**Gen-Arc**—Arc Welders. General Equipment Co., Wichita, Kan.  
**Genasco**—Cement, Paint, Roofing, Shingles, Waterproofing Compounds, Barber Co., Philadelphia, Pa.  
**General**—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.  
**Generator**—Coils. Hotstream Heater Co., Cleveland, O.  
**Genil**—Oil Burner. Nu - Way Corp., Rock Island, Ill.  
**Genuine Detroit**—Controls, Humidistats, Motors, Relays, Switches, Thermostats and Transformers. Detroit Lubricator Co., Detroit, Mich.  
**Giant**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Giant Nite**—Fans, Ventilators. Russell Electric Co., Chicago, Ill.  
**Gibraltar**—Furnaces. P. H. Magill Foundry & Furnace Works, Bloomington, Ill.  
**Gilbarco**—Furnaces. Gilbert & Barker Mfg. Co., Springfield, Mass.  
**Gilt Edge**—Furnaces and Stokers. Schwab Furnace & Mfg. Co., Milwaukee.  
**Gimco**—Insulation. General Insulating & Mfg. Co., St. Louis.  
**Globe**—Eaves Trough and Gutters, Ridge Rolls and Ridging, Roofing, Sheets, Shingles and Tile. Newport Rolling Mill Co., Newport, Ky.  
**Glo-Fyr**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Glowan**—Gas Burners. J. O. & C. U. Martin, San Francisco.  
**Gnome**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Gohl**—Eaves Trough & Gutters, Ridge Rolls and Ridging, Roofing. Newport Rolling Mill Co., Newport, Ky.  
**Golden Rod**—Blowers, Wheels. F. Jaden Mfg. Co., Inc., Hastings, Nebr.  
**Golden Star**—Ridge Rolls and Ridging. J. M. & L. A. Osborn Co., Cleveland, O.  
**Grand Rapids**—Vacuum Furnace Cleaner. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.  
**Graylite**—Building and Duct Insulation. Insulite Co., Minneapolis, Minn.

**Grid**—Heating and Cooling Coils. Unit Heater & Cooler Co., Wausau, Wis.  
**Grillometer**—Direct Reading Air Velocity Meter. Detroit Air Meter Co., Detroit, Mich.  
**Gulfsteel**—Nails, Plates, Ridge Rolls and Ridging, Roofing, Sheets, Structural Shapes, Wire. Gulf States Steel Co., Birmingham, Ala.

## H

**H & C**—Chain, Clips and Tips, Faces, Grilles, Pulleys, Quadrants, Registers, Regulators, Ventilators. Hart & Cooley Mfg. Co., Chicago, Ill.  
**Hairbestos**—Insulation. Wilson & Co., Inc., Chicago, Ill.  
**Haircraft**—Insulation. Wilson & Co., Inc., Chicago, Ill.  
**Hammerkraft**—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn.  
**Handnib**—Punches. National Machine Tool Co., Racine, Wis.  
**Handy**—Furnace and Smoke Pipe, Prefabricated Ducts and Fittings, Ventilators. F. Meyer & Bro. Co., Peoria, Ill.  
**Handy-Andy**—Clinker Tong. Northwestern Stove Repair Co., Chicago, Ill.  
**Handy Change**—Arc Welders. Maple Valley Mfg. Co., Mapleton, Iowa.  
**Happy Thought**—Heaters. Pittston Stove Co., Pittston, Pa.  
**Hardweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.  
**Health Air**—Blowers, Furnaces, Humidifiers, Washers. Economy Baler Co., Ann Arbor, Mich.  
**Health-air**—Fans and Blowers. Johnson Fan & Blower Corp., Chicago, Ill.  
**Healthifiers**—Register Shields with Humidifier. Patent Novelty Co., Fulton, Ill.  
**Healthmaster**—Air Conditioning Units, Blowers, Ducts and Fittings, Furnaces, Heaters. Chandler Co., Cedar Rapids, Iowa.  
**Heat-Aid**—Furnace Linings. Pyrolite Products Co., Cleveland, Ohio.  
**Heath Dual**—Range Draft Gage. Detroit Air Meter Co., Detroit.  
**Heat-O-Meter**—Heat Savers. Air-n-Oil Burners & Heating Utilities, Inc., Brooklyn, N. Y.  
**Heat-Pak**—Oil Burners. Aldrich Co., Peoria, Ill.  
**Heatrols**—Heaters. Estate Stove Co., Hamilton, O.  
**Heatseal**—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.  
**Heatseal**—Oil Burners. Crystal Refrigerator Co., Fremont, Nebr.  
**Heat-X-Tractor**—Heat Savers. Air-n-Oil Burners & Heating Utilities, Inc., Brooklyn, N. Y.  
**Heavyduty**—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.  
**Heetrozone, The**—Air Conditioning Units. American Air Conditioning Co., Minneapolis, Minn.  
**Hellite**—Refractories. Johns - Manville, New York, N. Y.  
**Hercules**—Arc Welders. Commonwealth Mfg. Corp., Cincinnati, O.  
**Hercules**—Fan Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.  
**Hercules**—Furnaces. Johnston Gas Furnace Corp., North Hollywood, Cal.  
**Hercules**—Gravity Roof Ventilators. Berger Bros. Co., Philadelphia.  
**Hercules**—Heavy Duty Furnace. Lennox Furnace Co., Inc., Marshalltown, Ia.  
**Herculoy**—Sheets. Revere Copper and Brass Incorporated, New York City.  
**Hero**—Furnaces. Standard Foundry & Furnace Co., DeKalb, Ill.  
**Hero**—Heaters. J. V. Patten Co., Sycamore, Ill.

**Highflex**—Belts. B. F. Goodrich Co., Akron, O.  
**Highway**—Copper Iron. Apollo Steel Co., Apollo, Pa.  
**Hilume**—Aluminum Paint. Hilo Varnish Corp., Brooklyn.  
**Hitoncast**—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.  
**Hoal**—Louvers. American Sheet Metal Works, New Orleans, La.  
**Hodell**—Furnace Chain. Chain Products Co., Cleveland, O.  
**Hoffman**—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.  
**Hold Heat**—Soldering Coppers. Turner Brass Works, Sycamore, Ill.  
**Hold-Heat**—Controls, Fans, Thermostats, Transformers. Russell Electric Co., Chicago, Ill.  
**Holgun**—Portable Electric Drills. Black & Decker Mfg. Co., Towson, Md.  
**Holtite-Phillips**—Screws and Bolts. Continental Screw Co., New Bedford, Mass.  
**Home**—Furnaces. Rock Island Stove Co., Rock Island, Ill.  
**Home**—Weather Strips. Chamberlin Metal Weather Strip Co., Detroit.  
**Home Comfort**—Blowers, Furnaces, Humidifiers. St. Louis Furnace Mfg. Co., St. Louis, Mo.  
**Hot Blast**—Soldering Furnaces and Torches. Turner Brass Works, Sycamore, Ill.  
**Hotco**—Furnaces, Oil Burners. Hotentot Co., Inc., Omaha, Nebr.  
**Hot-Kold**—Furnaces. Edwards Mfg. Co., Inc., Cincinnati, O.  
**Hot Spot**—Electric Welders. Acme Electric Welder Co., Huntington Park, Cal.  
**Hot Wave**—Coils. Rudy Furnace Co., Dowagiac, Mich.  
**Howle**—Heat Savers. Condensation Engineering Corp., Chicago, Ill.  
**Hoyt**—Roofing. National Lead Co., New York, N. Y.  
**Huber**—Overfeed Stokers. Flynn & Emrich Co., Baltimore, Md.  
**Humid-Aire**—Humidifiers. Meyer Furnace Co., Peoria, Ill.  
**Humidair**—Humidifiers, Washers. American Foundry & Furnace Co., Bloomington, Ill.  
**Humidiguide**—Hygrometer. Taylor Instrument Companies, Rochester, N. Y.  
**Humidostat**—Humidistats. Johnson Service Co., Milwaukee, Wis.  
**Humitherm**—Air Conditioning Units. Grinnell Co., Inc., Providence, R. I.  
**Humitrol**—Humidity Controls. Mayflower-Lewis Corp., St. Paul, Minn.  
**Hydrolator**—Water Circulating Pump. Janette Mfg. Co., Chicago.  
**Hydron**—Thermostatic Bi-Metals. Clifford Mfg. Co., Boston, Mass.  
**Hydronon**—Concrete Waterproofing Paint. Barrett Co., New York City.  
**Hydro-Proof**—Water-Proofing Compounds. Asphalt Products Co., Syracuse, N. Y.  
**Hy-Duty**—Fan Bearings, Fans, Blowers, Pumps, Ventilators, Wheels. Schwitzer-Cummins Co., Indianapolis, Ind.  
**Hy-Power**—Furnaces. Rudy Furnace Co., Dowagiac, Mich.  
**Hy-Power**—Snips and Shears. Wiss & Sons Co., J. Newark, N. J.  
**Hyro**—Dampers, Handles, Punches, Regulators. Parker-Kalon Corp., New York, N. Y.  
**Hytast**—Paint. National Mfg. Co., Tonawanda, N. Y.

**IEC**—Stoker Control, Relays, Switches, Timers. Industrial Engineering Corp., Evansville, Ind.

**Ice-O-Matic**—Compressors. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

**Ideal**—Air Conditioning Units. Norge Heating & Conditioning Div.—Borg-Warner Corp., Detroit, Mich.

**Ideal**—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

**Ideal**—Roofing Nails. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

**Ideal (Air-Cell)**—Insulation. Hinde & Dauch Paper Co., Sandusky, Ohio.

**Ideal King**—Furnaces. Kansas City Furnace Co., Kansas City, Mo.

**Ilgair**—Fans. Ilg Electric Ventilating Co., Chicago, Ill.

**Imperial**—Hangers. Berger Bros. Co., Philadelphia, Pa.

**In-Cel-Wood**—Insulation. Cornell Wood Products Co., Chicago, Ill.

**Inco**—Paint. Inter-Coastal Paint Co., East St. Louis, Ill.

**Inco**—Welding Rod. International Nickel Co., Inc., New York City.

**Indian**—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

**Indian**—Oil Burners. Pioneer Manufacturing Co., Cedar Rapids, Ia.

**Inglad**—Sheets. Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

**Insuluma**—Insulating Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

**Insa-Lute**—Furnace Cement. Sauereisen Cements Co., Pittsburgh, Pa.

**Ins-Light**—Building and Duct Insulation. Insulite Co., Minneapolis.

**Interlock**—Conductor Pipe. Milcor Steel Co., Milwaukee, Wis.

**Invisible Joint**—Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.

**Ironite**—Hot Surface Paint. Acorn Refining Co., Cleveland.

**Ironset**—Furnace Cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.

**Ironsides**—Paint. Thompson & Co., Pittsburgh, Pa.

**Ironton**—Gas Burners, Heaters. Continental Stove Corp., Ironton, O.

**Isl City**—Registers. Rock Island Register Co., Rock Island, Ill.

**Iso-Tem**—Automatic Heat Control. Tem Products Co., Midland, Pa.

## J

**J-M**—Insulation, Roofing. Johns-Manville, New York, N. Y.

**J.M.C.**—Oil Burners. Johnson Mfg. Co., Waterloo, Iowa.

**Jack Frost**—Insulation. Barrett Co., New York City.

**Janitrol**—Blowers, Furnaces, Gas Burners. Surface Combustion Corp., Toledo, O.

**Jennings**—Pumps. Nash Engineering Co., South Norwalk, Conn.

**Jewel**—Furnaces, Heaters, Repairs. Detroit-Michigan Stove Co., Detroit.

**Jifco**—Coils. Hotstream Heater Co., Cleveland, O.

**Jointite**—Insulation. Mundet Cork Corp., New York, N. Y.

**Jordan Aero**—Ventilators. Paul R. Jordan & Co., Inc., Indianapolis, Ind.

**Junesaire**—Air Conditioning Units, Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

**Juniata**—Soldering Flux. Geo. W. Diener Mfg. Co., Chicago, Ill.

**Junior**—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

**Junior-Aire**—Oil-Burning Air Conditioning Furnace. Lochinvar Corp., Dearborn, Mich.

**Justrite**—Duct Fittings. Corbman Bros., Inc., Philadelphia, Pa.

**Justrite L-Bo**—Furnace Pipe & Fittings. Corbman Bros., Inc., Philadelphia.

## K

**KOB**—Eaves Trough and Gutters, Ridge Rolls and Ridging, Roofing and Sheets. Newport Rolling Mill Co., Newport, Ky.

**K.S.V.**—Ventilators. Kernchen Co., Chicago, Ill.

**KableKord**—Belts. L. H. Gilmer Co., Philadelphia, Pa.

**Kant Klog**—Nozzles. Howell Manufacturing Co., Kansas City, Mo.

**Kant Krush**—Roof Strainers. Grand Rapids Wire Products Co., Grand Rapids, Mich.

**Kelsey-Bradley**—Furnaces. Kelsey Heating Co., Inc., Syracuse, N. Y.

**Kemick**—Paint. American Chemical Paint Co., Ambler, Pa.

**Ken**—Flue Gas Analyzers, Controls, Thermometers and Valves. Barclay, Inc., Robert, Chicago.

**Keystone**—Heaters. J. V. Patten Co., Sycamore, Ill.

**Keystone**—Sheets. Carnegie Illinois Steel Corp., Pittsburgh, Pa.

**Kimsul**—Insulation. Kimberly-Clark Corp., Chicago.

**Kleenfo**—Filters. Air-Maze Corp., Cleveland.

**Klixon**—Controls, Switches, Thermostats, Timers. Spencer Thermostat Co., Attleboro, Mass.

**Kitchenaire**—Fans. Allen Corp., Detroit.

**Knock-Out**—Arc Welding Electrodes, Welding Rod, Arc Welders. K. O. Lee & Son Co., Aberdeen, S. D.

**Knowles**—Air Conditioning Furnace. Marshall Heating Co., Minneapolis.

**Knox**—Smoke Pipe. Waterloo Register Co., Waterloo, Ia.

**Kom-Pak**—Filters. Independent Air Filter Co., Chicago, Ill.

**Konical**—Ventilators. Milcor Steel Co., Milwaukee, Wis.

**Kooler-Aire**—Blower-Washer Combinations. U. S. Air Conditioning Corp., Minneapolis.

**Koppax**—Paint. Koppers Co., Pittsburgh, Pa.

**Kor-Wer-Lok**—Pittsburgh lock forming machine. Binkley Mfg. Co., Warrenton, Mo.

**Kramer**—Trenton Auto Radiator Wks., Trenton, N. J.

**Kristokrak**—Enamels and Lacquers. Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.

**Kuehn's**—Gutters, Ridge Rolls and Ridging. Milcor Steel Co., Milwaukee.

**Kwiklok**—Humidifier Fittings. Air Conditioning Supply Co., Cleveland.

**Kwikturn**—Humidifier Fittings. Air Conditioning Supply Co., Cleveland.

## L

**L. A.**—Motors. Louis Allis Co., Milwaukee, Wis.

**L & N**—Instruments. Leeds & Northrup Co., Philadelphia, Pa.

**L & B**—Conductor Pipe. Lamb & Ritchie Co., Cambridge, Mass.

**L-B**—Flexible Couplings. Lovejoy Flexible Coupling Co., Chicago, Ill.

**L-U**—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**Lakeside**—Blowers. Furblo Co., Hermansville, Mich.

**Lanool**—Stainless Steel Soldering Flux. F. H. Langsenkamp Co., Indianapolis, Ind.

**Lastik Wampum**—Cement Paint. Lastik Products Co., Inc., Pittsburgh.

**Laurel**—Repairs. Detroit-Michigan Stove Co., Detroit, Mich.

**Lawson**—Heaters. Continental Stove Corp., Ironton, O.

**Leader**—Oil Burners. Pressure Oil Burners, Inc., York, Pa.

**Leader**—Oil Burners and Circulating Heaters. Victor Oil Burner Mfg. Co., Hartford, Conn.

**Lectrik Ice**—Refrigerating Compressors. Uniflow Mfg. Co., Erie, Pa.

**Lectro-Shear**—Portable Electric Shears. Black & Decker Mfg. Co., Towson, Md.

**Lehigh**—Furnaces, Heaters. Pittston Stove Co., Pittston, Pa.

**Leonard**—Circulating Oil Heater. W. R. Ames Co., San Francisco.

**LeRoy**—Fan and Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**Liberty**—Paint. Carter Paint Co., Liberty, Ind.

**Lifetime**—Furnace Pipe Fittings & Accessories. Campbell Heating Co., Des Moines, Ia.

**Lightweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Lima**—Stokers. John R. Carnes, Inc., Lima, O.

**Lincoln**—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

**Linc-Weld**—Motors. Lincoln Electric Co., Cleveland, O.

**Linseal**—Furnace Cement. Buckeye Products Co., Cincinnati, Ohio.

**Lipman**—Air Conditioning Units, Coils, Compressors. General Refrigeration Corp., Beloit, Wis.

**Liquidelastigum**—Paint. Barrett Co., New York City.

**Little Blacksmith**—Punches. J. F. Kidder Mfg. Co., Inc., Burlington, Vt.

**Little Giant**—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

**Lleacro**—Fire Doors. Cornell Iron Works, Inc., Long Island City, N. Y.

**Lloyd's**—Stainless Steel Soldering Flux. Alumaweld Co. of America, Chicago.

**Lo-Blast**—Gas Conversion Burners. National Machine Works, Chicago, Ill.

**Lo-Boy**—Stokers. Whiting Corp., Harvey, Ill.

**LokJoint**—Building Insulation. Insulite Co., Minneapolis, Minn.

**Lornate**—Chimney Caps & Tops, Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**Lucco**—Acid Brushes, Compounds, Flux, Solder. Thos. F. Lukens Metal Co., Philadelphia, Pa.

**Ludite**—Stainless Steel. Allegheny Ludlum Steel Corp., Brackenridge, Pa.

**Lukenweld**—Vibration Isolating Bases and Pads. Lukens Steel Co., Coatesville, Pa.

**Lumino**—Paint. Koppers Co., Pittsburgh, Pa.

**Lumital**—Aluminum Paint. National Mfg. Co., Tonawanda, N. Y.

## M

**M. E.**—Air Conditioning Units. C. A. Dunham Co., Chicago, Ill.

**M & E**—Compressors, Solder. Merchant & Evans Co., Philadelphia, Pa.

**M.F.C.**—Gas Floor Furnaces. Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.

**M & H**—Zinc Sheets. Matthlessen & Hegeler Zinc Co., LaSalle, Ill.

**M & M**—Humidifier Valves. McDonnell & Miller, Chicago, Ill.

**M-VB**—Humidifier Fittings, Valves. Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.

**Macheta**—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.

**Mack**—Heaters. J. V. Patten Co., Sycamore, Ill.

**Magie**—Chimney Caps and Tops. Providence Cornice Co., Providence, R. I.

**Majestic**—Roofing, Skylights, Ventilators. W. A. Fingles, Inc., Baltimore, Md.



**Manganweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Mark Time**—Time Switches. M. H. Rhodes, Inc., Hartford, Conn.

**Marvel**—Punches. Armstrong-Blum Mfg. Co., Chicago, Ill.

**Marvelaire**—Air Conditioning Units and Furnaces. Star Radiator Co., Los Angeles.

**Massachusetts**—Blowers, Fans. Bishop & Babcock Mfg. Co., Cleveland, O.

**Master**—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.

**Master**—Controls, Motors, Thermostats. White Mfg. Co., St. Paul, Minn.

**Master**—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

**Master**—Hangers and Fittings. Royal Apex Mfg. Corp., Brooklyn, N. Y.

**Master Kraft**—Air Conditioning Units, Oil Burners, Regulators and Heat Savers. Harvey-Whipple, Inc., Springfield, Mass.

**Master Line**—Soldering Torches. Turner Brass Works, Sycamore, Ill.

**Master Stoker**—Stokers. Muncie Gear Works, Inc., Muncie, Ind.

**Mastr-Lok**—Pipe Fittings. Parkersburg Iron & Steel Co., Parkersburg, W. Va.

**Mayflower**—Refrigerating Compressors. Hardy Mfg. Co., Dayton, O.

**Mellvaine**—Oil Burners. Landwehr Heating Corp., Philadelphia, Pa.

**Melloblu**—Gas Burners. Beck Engineering Combustion Company, St. Louis, Mo.

**Mellow**—Furnaces. Liberty Foundry Co., St. Louis, Mo.

**Mellow-Aire**—Furnaces. Liberty Foundry Co., St. Louis.

**Mel-Rock**—Blowers, Collectors, Fans, Ventilators and Washers. Mellish & Murray Co., Chicago.

**Metalace**—Registers. American Foundry & Furnace Co., Bloomington, Ill.

**MetaLane**—Metal Weather Strips. Monarch Metal Weatherstrip Corp., St. Louis, Mo.

**Metal Master**—Brakes, Shears, Welders. Glascock Bros. Mfg. Co., Muncie, Ind.

**Met-L-All**—Weather Strips. Metal Products Co., Cincinnati, O.

**Metrotherm**—Thermostats. General Controls Co., Glendale, Cal.

**Meyco**—Furnaces. Meyer Furnace Co., Peoria, Ill.

**Microstat**—Thermostats. Julien P. Friez & Sons, Baltimore.

**Micro-Weld**—Spot Welders. Micro Products Co., Chicago.

**Midas**—Spot Welders. Commonwealth Mfg. Corp., Cincinnati, O.

**Midget**—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

**Miles, Jr.**—Propeller Furnace Fans. Henry Furnace & Foundry Co., Cleveland, O.

**Milwaukee**—Ventilators. Milcor Steel Co., Milwaukee, Wis.

**Minnemeyer**—Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

**Mistoll**—Oil Burners. Wayne Oil Burner Corp., Fort Wayne, Ind.

**Mistolator**—Oil Burners. Automatic Burner Corp., Chicago, Ill.

**Mobilair**—Room Air Conditioning Unit. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**Model**—Furnaces, Heaters. Home Stove Co., Indianapolis, Ind.

**Model A**—Furnaces, Heaters. Williamson Heater Co., Cincinnati, O.

**Moderator**—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

**Modern-Aire**—Warm Air Furnaces. Des Moines Stove Repair Co., Des Moines, Iowa.

**Modern-Aire**—Furnaces, Blowers. Agricola Furnace Co., Gadsden, Ala.

**Modern Hearth**—Furnaces. Thompson Mfg. Co., Denver, Colo.

**Moderne**—Blowers, Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

**Modernistic**—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

**Moditherm**—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

**Modutrol**—Dampner Duct Motors. Minneapolis-Honeywell Regulator Co., Minneapolis.

**Moistair**—Furnaces. Round Oak Co., Dowagiac, Mich.

**Moistair Blended Iron**—Furnaces. Round Oak Co., Dowagiac, Mich.

**Moistair Boiler Plate**—Furnaces. Round Oak Co., Dowagiac, Mich.

**Moler**—Insulation. F. L. Smlith & Co., New York City.

**Monarch**—Furnaces. Forest City Foundries Co., Cleveland.

**Monarch**—Furnaces. Kruse & Dewenter Co., Indianapolis, Ind.

**Moncrief**—Furnaces, Furnace Repairs, Prefabricated Ducts. Henry Furnace & Foundry Co., Cleveland, O.

**Monel**—International Nickel Co., Inc., New York City.

**Monitor**—Furnaces. Marshall Furnace Co., Marshall, Mich.

**Monitor**—Furnaces. Thiele Furnace Co., Inc., Indianapolis, Ind.

**Monopipe**—Gas Floor Furnaces. Lennox Furnace Co., Marshalltown, Ia.

**Morning Air**—Furnaces. Jackson Sheet Metal Wks., Ogden, Utah.

**Motex**—Solder. Consolidated Metals Corp., Detroit.

**Moto-Heat**—Oil Burners. Brigham Oil Burner Co., St. Louis, Mo.

**Motopump**—Water Circulating Pumps. Yeomans Bros. Co., Chicago.

**Mototuro**—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

**Muelleraire**—Air Conditioning Units. L. J. Mueller Furnace Co., Milwaukee, Wis.

**Multiclone**—Collectors. Research Corp., New York, N. Y.

**Multi-Panel**—Filters. American Air Filter Co., Inc., Louisville, Ky.

**Multitherm**—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

**Multi-V**—Filters. Staynew Filter Corp., Rochester, N. Y.

**Multi-Vane**—Ventilators. Allen Corp., Detroit.

**Murex**—Arc Welding Electrodes. Metal & Thermit Corp., New York City.

**M/W and A/C**—Filters. American Air Filter Co., Inc., Louisville, Ky.

## N

**Nairoil**—Oil Burners. National Airoil Burner Co., Philadelphia, Pa.

**National**—Blowers, Furnaces and Washers. P. H. Magirl Foundry & Furnace Wks., Bloomington, Ill.

**National**—Dampner Clips and Tips. U. S. Register Co., Battle Creek, Mich.

**National**—Furnaces, Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill.

**Natroco**—Paint. National Mfg. Corp., Tonawanda, N. Y.

**Nelco**—Duct Insulation. B. F. Nelson Mfg. Co., Minneapolis, Minn.

**Nelson**—Stokers. Heating Assurance, Inc., Spokane, Wash.

**Nesbit**—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.

**Never Slip**—Conductor Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

**New American**—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.

**Newark**—Furnaces. May-Fiebeger Co., Newark, Ohio.

**Newmanco**—Kalamein Doors, Grilles, Registers. Newman Brothers, Inc., Cincinnati, O.

**Newport**—Instruments. Johnson Tool Co., Inc., East Providence, R. I.

**Niagara**—Air Conditioning Units, Furnaces. Forest City Foundries Co., Cleveland, O.

**Niteair**—Night Air Cooling Fans. Lau Blower Co., Dayton, Ohio.

**Nitroil**—Nozzles. Hubbard Co., Minneapolis, Minn.

**Nokol**—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.

**Non-Con-Dux**—Cement, Insulation. Paint, Paper, Paste. Grant Wilson, Inc., Chicago, Ill.

**No Noise**—Blowers. American Foundry & Furnace Co., Bloomington, Ill.

**Norble**—Blowers, Collectors, Filters, and Air Washers. Northern Blower Co., Cleveland, Ohio.

**Norco**—Furnaces, Furnace Cement, Pipe and Fittings, Registers and Grilles, Tank Heaters, Stoves, etc. Northwestern Stove Repair Co., Chicago, Ill.

**Norfolk**—Blower-Filters, Furnaces, Heaters, Humidifiers. Sioux City Foundry and Boiler Co., Sioux City.

**Northland**—Heaters. J. V. Patten Co., Sycamore, Ill.

**Northwestern**—Furnaces. Western Furnaces, Inc., Tacoma, Wash.

**Norwester**—Blowers. Grand Rapids Die & Tool Co., Grand Rapids, Mich.

**Norwol**—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.

**No-Sag**—Register Shields. Pentecost & Craft Co., Terre Haute, Ind.

**No-Streak**—Registers. Rock Island Register Co., Rock Island, Ill.

**Novoid**—Aluminum Paint. Bases, Insulation. Cork Import Corp., New York, N. Y.

**Nu-Air**—Blades and Fans. Meier Electric & Machine Co., Indianapolis, Ind.

**Nu-Air**—Ventilators. Milcor Steel Co., Milwaukee, Wis.

**Nu-Alpina**—Gravity Roof Ventilators. Milcor Steel Co., Milwaukee, Wis.

**Nu-Dry**—Furnace Cement. Pyrolite Products Co., Cleveland, O.

**Nugget**—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.

**Nu-Notch**—Ventilators. Knowles Mushroom Ventilator Co., New York, N. Y.

**Nuroof**—Roof Cement. Acorn Refining Co., Cleveland.

**Nusurface**—Hot Surface Paint. Acorn Refining Co., Cleveland.

**Nutipe**—Gas Conversion Burners. Columbia Burner Company, Toledo.

**Nu-Way Evans**—Warm Air Conditioners. Nu-Way Corp., Rock Island, Ill.

**Nu-Wood**—Rigid Insulation. Wood Conversion Co., St. Paul.

## O

**Ohio Lock**—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

**Oil-Economy**—Oil-Burning Air-Conditioning Furnace. International Heater Co., Utica, N. Y.

**Oil-Eighty**—Boiler Burner Unit. Fitzgibbons Boiler Co., Inc., New York.

**Oilfyre**—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

**Oil Master**—Furnaces. Round Oak Co., Dowagiac, Mich.

**Oil Master Airkleser**—Air Conditioning Furnace. Round Oak Co., Dowagiac, Mich.

**Oil-O-Matic**—Oil Burners. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.



**OK**—Conductor Pipe Strainers. U. S. Cistern Filter Mfg. Co., Bloomington, Ill.

**Oil-n-Aire**—Oil Burners. Aldrich Co., Peoria, Ill.

**Ol' Faithful**—Maid-O'-Mist, Inc., Chicago.

**Olympic**—Furnaces. Washington Stove Works, Everett, Wash.

**Open Dome**—Furnaces. American Furnace & Foundry Co., Milan, Mich.

**Orient**—Furnaces. Thiele Furnace Co., Indianapolis, Ind.

**Ornatomat**—Flue Gas Analyzer. Hays Corp., Michigan City, Ind.

**Oshkosh**—Stokers. Leach Co., Oshkosh, Wis.

**OutWall**—Registers. Rock Island Register Co., Rock Island, Ill.

**Ovaltube**—Gas Burners. Beck Engineering Combustion Company, St. Louis.

**Oxweld**—Welding Apparatus. Linde Air Products Co., New York, N. Y.

**Oxite**—Insulation. American Hair & Felt Co., Chicago, Ill.

## P

**P. & H.**—Motors. Harnischfeger Corp., Milwaukee, Wis.

**P. & H. Hansen**—Arc Welders. Harnischfeger Corp., Milwaukee, Wis.

**P & E**—Air Conditioning Units, Furnaces and Pumps. Pernot & Rich, Inc., Los Angeles.

**Pacifelt**—Insulation. Pacific States Felt & Mfg. Co., Inc., San Francisco.

**Pacific**—Furnaces. W. W. Rosebraugh Co., Salem, Ore.

**Pacific Breeze**—Fans. Pryne & Co., Inc., Los Angeles, Cal.

**Pacific Everlast**—Furnaces. Pacific Gas Radiator Co., Los Angeles.

**Packingsless**—Pumps. Chandler Co., Cedar Rapids, Ia.

**Paintgrip**—Sheets. American Rolling Mill Co., Middletown, Ohio.

**Pakinsul**—Insulation. Refractory & Insulation Corp., New York City.

**Palco Wool**—Insulation. Pacific Lumber Co., San Francisco, Cal.

**Par**—Refrigerating and Air Conditioning Compressors. Modern Equipment Corp., Defiance, Ohio.

**Paramount**—Flashings. Rochester Lead Works, Inc., Rochester, N. Y.

**Paramount**—Hollow Metal Windows. Willis Mfg. Co., Galesburg, Ill.

**Parco**—Skylight Lifts. Park City Corncice Works, Inc., Bridgeport, Conn.

**Patrola**—Heaters. J. V. Patten Co., Sycamore, Ill.

**Patterson**—Roofing Clips. American Sheet Metal Works, New Orleans.

**Pebble**—Grilles. American Foundry & Furnace Co., Bloomington, Ill.

**Pebble**—Registers. Auer Register Co., Cleveland, O.

**Pebble Face**—Faces. American Foundry & Furnace Co., Bloomington, Ill.

**Peerless**—Blowers, Collectors, Washers. New York Blower Co., Chicago, Ill.

**Peerless**—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.

**Penn-Mont**—Slate. Structural Slate Co., Pen Argyl, Pa.

**Perfect**—Furnaces, Humidifiers. Richardson & Boynton Co., New York.

**Perfect-Fit**—Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.

**Permopad**—Filters. Independent Air Filter Co., Chicago, Ill.

**Perry**—Damper Clips and Tips. Griswold Mfg. Co., Erie, Pa.

**Pet**—Oil Burners. Aldrich Co., Peoria, Ill.

**Petro**—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.

**Pexto**—Metal Workers' Machines and Tools. Peck, Stow & Wilcox Co., Southington, Conn.

**Phaeton**—Heaters. Excelso Products Corp., Buffalo, N. Y.

**Phoenix**—Windows. Russell Insulation Co., F. C., Cleveland.

**Pioneer**—Oil Burners. Scott-Newcomb, Inc., St. Louis, Mo.

**Plastic Cork**—Duct Insulation. Presttite Engineering Co., St. Louis Mo.

**Plastic Elastigum**—Cement. Barrett Co., New York City.

**Plastic PB**—Cement. Barrett Co., New York City.

**Plastiklast**—Roof Cement and Waterproofing Compound. Acorn Refining Co., Cleveland.

**Plastikon**—Glazing Compounds. B. F. Goodrich Co., Akron, O.

**Plastoid**—Compounds, Furnace Cement. Plastic Products Co., Detroit, Mich.

**Pleasant Home**—Furnaces. Peerless Foundry Co., Inc., Indianapolis, Ind.

**Flexiform**—Blowers. Bayley Blower Co., Milwaukee, Wis.

**Plicast**—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.

**Plymco**—Air Filters. Plymouth Cordage Co., North Plymouth, Mass.

**Polar Giant**—Air Conditioning Units. Giant Manufacturing Co., Council Bluffs, Iowa.

**Porcelite**—Tile. Columbian Enameling & Stamping Co., Inc., Terre Haute, Ind.

**Portage**—Furnaces. XXth Century Heating & Ventilating Co., Akron, O.

**Positive Arc**—Arc Welders. Welding Apparatus Co., Chicago, Ill.

**Precipitron, Electrostatic**—Automatic Air Filter. Westinghouse Electric & Manufacturing Co., Cleveland.

**Premier**—Arc Welding Electrodes, Welding Rod. American Steel & Wire Co., Chicago, Ill.

**Premier**—Furnace Vacuum Cleaner. Electric Vacuum Cleaner Co., Inc., Cleveland, O.

**Premier**—Sheets. Reeves Steel & Mfg. Co., Dover, Ohio.

**Premier**—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.

**Premier Automatik**—Stoker-Fired Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

**Premier DeLuxe**—Furnaces. Premier Furnace Co., Dowagiac, Mich.

**Premier Master**—Furnaces. Premier Furnace Co., Dowagiac, Mich.

**Premier Steel**—Furnaces. Premier Furnace Co., Dowagiac, Mich.

**Presstite**—Furnace and Roof Cement. Presttite Engineering Co., St. Louis.

**Prest-O-Lite**—Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.

**Prest-O-Weld**—Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.

**Princo**—Hygrometers, Psychrometers, Electric Relays, Thermometers and Thermostats. Precision Thermometer and Instrument Co., Philadelphia.

**Probert**—Kalamein Doors. California Cornice, Steel and Supply Corp., Los Angeles, Cal.

**Protection**—Soldering Furnaces and Torches. Clayton & Lambert Mfg. Co., Detroit, Mich.

**Protectomotor**—Filters. Staynew Filter Corp., Rochester, N. Y.

**Protector**—Snow Guards. David Levow, New York City.

**Protectorelay**—Electric Relays. Minneapolis-Honeywell Regulator Co., Minneapolis.

**Protectovent**—Window Ventilator and Filter Units. Staynew Filter Corp., Rochester, N. Y.

**Protex**—Protective Coating for Metal. Haydn F. White & Co., Cleveland.

**Pulverzone**—Stokers. American Coal Burner Co., Chicago, Ill.

**Punkah**—Louvres. Kelvin-White Co., Boston.

**Pure-Air**—Furnaces. Enterprise Boiler & Tank Works, Inc., Chicago, Ill.

**Purox**—Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.

**Pyralox**—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

**Pyrobar**—Roofing Tile. United States Gypsum Co., Chicago.

**Pyrofelt**—Building and Duct Insulation. Mineral Felt Co., Toledo, O.

## Q

**Quaker Burnoil**—Oil Burners, Furnaces and Heaters. Quaker Mfg. Co., Chicago.

**Quaker City**—Fittings and Accessories, Conductor, Eaves Trough and Gutter Pipe. Berger Bros. Co., Philadelphia, Pa.

**Quick Cleaner**—Furnace Brushes. Pilley Packing & Flue Brush Mfg. Co., St. Louis, Mo.

**Quiet May**—Air Conditioning Furnaces, Oil Burners. May Oil Burner Corp., Baltimore, Md.

## R

**R. & G.**—Cold Air Faces, Grilles, Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

**R & M**—Fans, Motors. Robbins & Myers, Inc., Springfield, O.

**R.M.C.**—Burners. Rotary Mfg. Co., Los Angeles, Cal.

**RPM**—Roofing Steel. H. H. Robertson Co., Pittsburgh.

**R-U-F**—Fans and Ventilators. Reed Unit-Fans, Inc., New Orleans, La.

**Race**—A. C. Furnace (Gas). Royal Air Conditioning Equipment, Compton, Cal.

**Radolite**—Refractories. Pyrolite Products Co., Cleveland, Ohio.

**Rainbow Mist**—Nozzles. Peterson Freezem Mfg. Co., Kansas City, Mo.

**Ralpo**—Sheet Metal Cutters. Ralph W. Poe, Canton, Ill.

**Rawl-Drive**—Hardened Masonry Nails. Rawlplug Co., Inc., New York City.

**Red Band**—Motors. Howell Electric Motors Co., Howell, Mich.

**Red Devil**—Furnace Cement. Pecora Paint Co., Philadelphia.

**Redi**—Stokers. General Machinery Co., Spokane, Wash.

**Redi-Nail**—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.

**Redox**—Paint. Thompson & Co., Pittsburgh, Pa.

**Red Spindle**—Dampers. Stover Mfg. & Engine Co., Freeport, Ill.

**Red Top**—Insulation. United States Gypsum Co., Chicago, Ill.

**Red Top**—Thermostats. H-B Instrument Company, Philadelphia, Pa.

**Reed**—Filters. American Air Filter Co., Inc., Louisville, Ky.

**ReFreshaire**—Winter Air Conditioning Units, Room Type. Summerheat Co., South Bend, Ind.

**Rego**—Oxy-Acetylene Welding Equipment. Bastian-Blessing Co., Chicago, Ill.

**Reilalloy**—Stove and Furnace Repairs. Pittsburgh Furnace Parts Co., Pittsburgh, Pa.

**Remote Control**—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

**Renu**—Filters. American Air Filter Co., Inc., Louisville, Ky.

**Republic**—Gas Conversion Burners. Autogas Corp., Chicago, Ill.

**Resisto-Board**—Asbestos Insulation. Ideal Commutator Dresser Co., Sycamore, Ill.

**Rex**—Bearings, Pillow Block, Blower-Filter Units, Fans and Ventilators. Air Controls, Inc., Cleveland.

**Rex**—Furnaces. Calkins & Pearce, Columbus, O.

**Rex-Airato**—Fans, Ventilators. Air Controls, Inc., Cleveland, O.

**Rex-Air-Pak**—Blower Units. Air Controls, Inc., Cleveland, O.

**Rexoil**—Oil Burners, Furnaces. Reif-Rexoil, Inc., Buffalo, N. Y.

**Resistal**—Stainless Steels. Crucible Steel Co. of America, New York.

**Rhino**—Caulking and Glazing Compounds. Pecora Paint Co., Philadelphia.

**Rincon-trol**—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Elizabeth, N. J.

**Rip-pl**—Enamels, Lacquers and Paints. Hilo Varnish Corp., Brooklyn.

**Rival**—Copper and Zinc Straps. David Levow, New York, N. Y.

**Riverside**—Furnaces. Rock Island Stove Co., Rock Island, Ill.

**Robertson**—Ventilators. California Cor-nice, Steel and Supply Corp., Los Angeles.

**Rocktex**—Insulation. Philip Carey Co., Lockland, Cincinnati, O.

**Rohaco**—Blowers, Smoke Pipe Fittings and Accessories, Furnaces, Grilles, Pipe, Registers, Heat Savers. Roberts-Hamilton Co., Minneapolis.

**Roofkoter**—Paint. Tropical Paint & Oil Co., Cleveland, O.

**RoofSaver**—Roofing Nails. Dickson Weatherproof Nail Co., Evanston, Ill.

**Rotoblast**—Furnaces. Moncrief Furnace Co., Atlanta, Ga.

**Rotoclone**—Dust Collectors. American Air Filter Co., Inc., Louisville, Ky.

**Rotojet**—Nozzles. Binks Mfg. Co., Chicago, Ill.

**Roxaprene**—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

**Royal**—Caulking Compounds, Cement, Paint. A. Wilhelm Co., Reading, Pa.

**Royal**—Dampers, Hangers, Strainers and Fittings, Snow Guards. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

**Royal**—Furnaces. Hart & Crouse Co., Inc., Utica, N. Y.

**Royalair**—Furnaces. Rock Island Stove Co., Rock Island, Ill.

**Royalastic**—Asbestos Cement. A. Wilhelm Co., Reading, Pa.

**Royalbestos**—Furnace Cement. A. Wilhelm Co., Reading, Pa.

**Royal Blue**—Acid and Furnace Brushes. Schaefer Brush Mfg. Co., Milwaukee, Wis.

**Royalseal**—Asbestos Paint. A. Wilhelm Co., Reading, Pa.

**Rubalt**—Enamels, Lacquers and Paint. Alfred Hague & Co., Inc., Brooklyn, N. Y.

**Ruberoid-Watson**—Cement, Insulation. The Ruberoid Co., New York City.

**Rubyfluid**—Solder, Soldering Flux, Tinning Compounds. Ruby Chemical Co., Columbus, O.

**Rudico**—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

**Rudisteel**—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

**Rusco**—Fans, Insulation, Ventilators. Russell Insulation Co., F. C., Cleveland, Ohio.

**Ryan**—Oil and Gas Burners, Solenoid Valves. R-S Products Corp., Philadelphia.

**S.A.C.**—Air Conditioning Units. Standard Air Conditioning, Inc., New York, N. Y.

**S-C**—Furnaces. Surface Combustion Corp., Toledo, O.

**S-E**—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**S-F**—Soldering Coppers, Torches. Sight Feed Generator Co., Richmond, Ind.

**SF-Victor**—Torches, Oxy-Acetylene Welding Equipment. Sight Feed Generator Co., Richmond, Ind.

**S.I.S.**—Cement. Barrett Co., New York.

**S-N**—Furnaces. Scott-Newcomb, Inc., St. Louis, Mo.

**Sachem**—Circulating Heaters. Gilbert & Barker Mfg. Co., Springfield, Mass.

**Safrol**—Controls. Penn Electric Switch Co., Goshen, Ind.

**Saf-ty**—Mallets. Martin Bersted Co., Chicago, Ill.

**St. Louis**—Stoker. Ormsby-Gray Combustion Service, Inc., St. Louis, Mo.

**Salmo**—Cement, Insulation, Pipe Coverings. Sall Mountain Co., Chicago, Ill.

**Sanco**—Cement. Standard Asbestos Mfg. Co., Chicago, Ill.

**Sampson**—Controls, Motors, Thermostats and Time Switches. Conco-Sampson Stoker Corp., Mendota, Ill.

**Sampson**—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

**Sanidair**—Humidifiers. U. S. Air Conditioning Corp., Minneapolis, Minn.

**Sanitary**—Furnaces. Thiele Furnace Co., Inc., Indianapolis, Ind.

**Satis-Fyre**—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.

**Savage**—Stokers. Model Mfg. Co., Richmond, Va.

**Sav-T-Heat**—Air Conditioning Furnaces. C. A. Dunham Co., Chicago, Ill.

**Schmidt**—Soldering and Brazing Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.

**Scroll-Pivoter**—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

**Scruplex**—Fans and Ventilators. L. J. Wing Mfg. Co., New York, N. Y.

**Seabreeze**—Kitchen Exhaust Fan. Emerson Electric Mfg. Co., St. Louis.

**Sealdslab**—Duct Insulation. Insulite Co., Minneapolis, Minn.

**Sealcrimp**—Flashing, Ridge Rolls and Ridging. American Rolling Mill Co., Middletown, Ohio.

**Seal-Less**—Condensing Units. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**Seal of Quality**—Roofing. Columbia Steel Co., San Francisco, Cal.

**Seal-Tite**—Roof Cement. C. Arthur Miller & Son, Elmira, N. Y.

**Seam Cement**—Furnace Cement. Hilo Varnish Corp., Brooklyn.

**Seamless**—Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.

**Seamless Oil-O-Matic**—Oil & Stoker Fired Furnaces. Waterman-Waterbury Co., Minneapolis.

**Security**—Caulking and Roofing. National Mfg. Corp., Tonawanda, N. Y.

**Selectair**—Air Conditioning Units and Oil Furnace. S. T. Johnson Co., Oakland, Cal.

**Self-Cleaning**—Furnaces. Moore Corp., Joliet, Ill.

**Selflock**—Furnace Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee, Wis.

**Selfvulc**—Waterproofing Compounds, Duct Insulation, Paint. Self-Vulcanizing Rubber Co., Inc., Chicago.

**Semco**—Presses and Dies, Punches. Service Machine Co., Elizabeth, N. J.

**Sensitrol**—Electrical Relays. Weston Electrical Instrument Corp., Newark, N. J.

**Shield-Arc**—Electrodes and Welders. Lincoln Electric Co., Cleveland, O.

**Shock Pads**—Vibration Isolating Pads. B. T. Butterworth, Jr., New Canaan, Conn.

**Shower-Proof**—Paint. Calbar Paint & Varnish Co., Philadelphia, Pa.

**Shur-Lock**—Pipe. Berger Bros. Co., Philadelphia, Pa.

**Silent**—Furnace Blowers. Air Conditioning Equipment Co., Minneapolis.

**Silent Air**—Fans and Blades. Belanger Fan & Oven Co., Detroit.

**Silentair**—Blowers, Filters, Washers. Gehri Co., Tacoma, Wash.

**Silent-Auburn**—Oil Burners, Furnaces, Heaters. Auburn Burner Co., Auburn, Ind.

**Silentblu**—Gas Burners. Beck Engineering Combustion Company, St. Louis.

**Silero**—Fans, Louvers, Shutters. Aire-Folle Fan & Blower Company, Detroit, Mich.

**Sil-Phos**—Welding Rod. Handy & Harmon, New York, N. Y.

**Silvercote**—Reflective Insulation. Specialty Converters, Inc., Chicago.

**Silver-Seal**—Aluminum Paint. Asphalt Products Co., Syracuse, N. Y.

**Simplex**—Dampers and Quadrants. Ohio Products Co., Cleveland.

**Simplex**—Humidifiers. Henry Kraker, Holland, Mich.

**Simplex**—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.

**Simplex**—Stoker. Stoker Products, Inc., Decatur, Ill.

**Simplex**—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.

**Sim-trol**—Smoke Pipe Draft Regulators. Simplex Mfg. Co., Fond du Lac, Wis.

**Sirocco**—Air Conditioning Units, Blowers, Fans, Washers, Wheels. American Blower Corp., Detroit.

**Slumberette**—Night Air Cooling Fan Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

**Snaplock**—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

**Snug-Fit**—Coils. Hotstream Heater Co., Cleveland, O.

**Softweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

**Solid Comfort**—May-Fieberger Co., Newark, Ohio.

**Soroco**—Chimney Caps and Tops. Southbridge Roofing Co., Southbridge, Mass.

**Sound - Pruf**—Vibration Eliminating Bases. W. D. Fabling Co., Los Angeles, Cal.

**Spando**—Waterproofing. Cheney Co., Philadelphia.

**Spatter Film**—Arc Welding Electrodes.

**SpecO**—Soldering Flux. Pfanstiehl Chemical Co., Waukegan, Ill.

**Spee Dee**—Coils. Air Controls, Inc., Cleveland, O.

**Speed-Up**—Concrete Waterproofing Cement. Hilo Varnish Corp., Brooklyn.

**Sphinx**—Burners, Furnaces, Humidifiers. C. L. Bryant Corp., Cleveland, O.

**Sphinx, Jr.**—Furnaces. C. L. Bryant Corp., Cleveland.

**Spiralaire**—Gun Type Oil Burner. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**Spiroidal**—Furnace Fans. Russell Electric Co., Chicago, Ill.

**Spirovane**—Ventilating Fans. Western Blower Co., Seattle, Wash.

**Spra-Rite**—Nozzles. Binks Mfg. Co., Chicago, Ill.

**Spraymaker**—Humidifiers. Lennox Furnace Co., Marshalltown, Iowa.

**Sprincolite**—Pulleys. American Pulley Co., Philadelphia, Pa.



**Stable-Arc**—Arc Welding Electrodes, Arc Welders. Lincoln Electric Co., Cleveland, O.

**Stack Heat**—Heat Savers. Robert Barclay, Inc., Chicago.

**Stalneld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Stamco**—Furnace Pipe, Fittings. Cincinnati Stamping Co., Cincinnati, O.

**Standard**—Furnaces. Aladdin Heating Corp., Oakland, Cal.

**Standard**—Furnaces. Home Furnace Co., Holland, Mich.

**Standard**—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.

**Standard**—Ventilators. Allen Corp., Detroit.

**Standard Tipton**—Furnaces. Klein Stove Co., Philadelphia.

**Star**—Furnaces. Arcweld Mfg. Co., Inc., Seattle, Wash.

**Star**—Solder. Eagle-Picher Lead Co., Cincinnati, O.

**Star**—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.

**Star**—Ventilators. Merchant & Evans Co., Philadelphia, Pa.

**Steamist**—Humidifiers. Van Osdel Mfg. Co., Bloomfield Hills, Mich.

**Ster-Na-Man**—Smoke Pipe Fittings and Accessories. A. G. Brauer Supply Co., St. Louis, Mo.

**Stewart**—Furnaces. Fuller-Warren Co., Milwaukee, Wis.

**Stic-Tite**—Cement and Insulation. Refractory & Insulation Corp., New York City.

**Stil-Blade**—Fans and Blades. Stilphen Eng. & Mfg. Co., C. A., Denver.

**Stokabilt**—Air Conditioning Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

**Stoker Economy**—Stoker Furnaces. International Heater Co., Utica, N. Y.

**Stoker-Ola**—Stokers. Advance Appliance Co., Peoria, Ill.

**Stoker "X"**—Stokers. Perfectaire Corp., Baltimore, Md.

**Stokol**—Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.

**Stokolair**—Blower-Filter Units. Schwitzer-Cummins Co., Indianapolis, Ind.

**Stokol-Heat**—Furnaces. Schwitzer-Cummins Company, Indianapolis, Ind.

**Stokol-Triplex**—Stokers. Schwitzer-Cummins Company, Indianapolis, Ind.

**Stowe**—Stokers. Johnston & Jennings Co., Cleveland, O.

**Streamaire**—Coils. Young Radiator Co., Racine, Wis.

**Streamline**—Furnaces. Aladdin Heating Corp., Oakland, Cal.

**Success**—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

**Summer Comfort**—Ventilating Fans. Air Controls, Inc., Cleveland.

**Sunbeam**—Air Conditioning Furnaces, Blower-Filter Units, Direct Expansion Coils, Refrigerating Compressors, Furnaces, Stoker-Fired Furnaces, Heaters. Fox Furnace Div. of American Radiator Co., Elyria, Ohio.

**Sunrise**—Oil Burners. Kais Sunrise Works, Detroit, Mich.

**Super**—Fans. Holtum Mfg. Co., Freeport, Ill.

**Super**—Hangers and Fittings. Royal Apex Mfg. Corp., Brooklyn, N. Y.

**Super**—Roof Flashing. Eagle-Picher Lead Co., Cincinnati, O.

**Super Air Screws**—Ventilating Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

**Superbrite**—Aluminum Paint. Acorn Refining Co., Cleveland.

**Super-Edger**—Power Flanging Machine. Whitney Metal Tool Co., Rockford, Ill.

**Superflex**—Furnaces, Heaters. Perfection Stove Co., Cleveland.

**Superfin**—Furnaces. American Fdry. & Furnace Co., Bloomington, Ill.

**Super Firma**—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo.

**Superior**—Blowers and Furnaces. Pacific Gas Radiator Co., Los Angeles, Cal.

**Superior**—Blowers, Filters, Ventilators. American Foundry & Furnace Co., Bloomington, Ill.

**Superior**—Furnaces. Richardson & Boynton Co., New York, N. Y.

**Superior**—Soldering Furnaces and Torches. P. Wall Mfg. Supply Co., Pittsburgh.

**Supermetal**—Steel Sheets. Superior Sheet Steel Co., Div. Continental Steel Corp., Canton, O.

**Super-Quiet**—Oil Burners. Green Fdry. & Furnace Wks., Des Moines, Ia.

**Super Red Streak**—Furnace Vacuum Cleaners. National Super Service Co., Toledo, O.

**Super Suction**—Furnace Vacuum Cleaners. National Super Service Co., Toledo, O.

**Super-Thermo**—Stucco for refractory maintenance (Refractory Lining Mix). Chicago Fire Brick Co., Chicago, Ill.

**Super-X**—Metal Shingles. Gulf States Steel Co., Birmingham, Ala.

**Supreme**—Furnaces. American Furnace & Foundry Co., Milan, Mich.

**Supreme**—Furnaces, Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

**Suredrane**—Roofing. Reeves Steel & Mfg. Co., Dover, Ohio.

**Surelok**—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

**Surety**—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

**Surfaceol**—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

**Synchron**—Stoker Controls, Relays, Switches, Timers. Industrial Engineering Corp., Evansville, Ind.

**Syphon-Air**—Ventilators. F. Meyer & Bro. Co., Peoria, Ill.

## T

**Tafco**—Air Filters. Tuttle Air Filter Co., Inc., Louisville, Ky.

**Tag**—Psychrometers, Recorders, Time Switches, Thermometers, Thermostats, Valves. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

**Tag-Mono**—Flue Gas Analyzers. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

**Tag Snapon**—Thermostats. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

**Tanco**—Ventilators. Tiffin Art Metal Co., Tiffin, O.

**Tanco**—Paint. Thompson & Co., Pittsburgh, Pa.

**Taylor**—Stokers. American Engineering Co., Philadelphia, Pa.

**Technotrol**—Electric Clock Thermostat. White Mfg. Co., St. Paul, Minn.

**Temlok**—Insulation. Armstrong Cork Co., Lancaster, Pa.

**Tempered-Aire**—Furnaces. Gar Wood Industries, Inc., Detroit, Mich.

**Templux**—Stokers. Morse Chain Co., Ithaca, N. Y.

**Tempryte**—Heat Insulating Windows. Truscon Steel Co., Youngstown, O.

**Temtrol**—Thermostats. Penn Electric Switch Co., Goshen, Ind.

**Texrope**—V-Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

**Tharco**—Furnace Cement. The Armstrong Company, Detroit, Mich.

**"The Pacific"**—Furnaces. W. W. Rosebraugh Co., Salem, Ore.

**Thermalair**—Furnaces. New York Blower Co., Chicago, Ill.

**Thermalfuel**—Furnaces. Beck Engineering Combustion Kompany, St. Louis.

**Thermo**—Furnaces for Stoker Firing. American Furnace Co., St. Louis.

**Thermo-Drip**—Humidifiers. Automatic Humidifier Co., Cedar Falls, Ia.

**Thermo-Flex**—Registers. H. C. Middleton Mfg. Co., Minneapolis, Minn.

**Thermofuel**—Air Conditioning Units. Beck Engineering Combustion Kompany, St. Louis, Mo.

**Thermogas**—Air Conditioning Units. Beck Engineering Combustion Kompany, St. Louis, Mo.

**Thermogrip**—Soldering Coppers. Ideal Commutator Dresser Co., Sycamore, Ill.

**Thermoll**—Furnaces. Beck Engineering Combustion Kompany, St. Louis.

**Thermolator**—Heaters. Pacific Gas Radiator Co., Los Angeles, Cal.

**Thermopane**—Windows. Libbey-Owens-Ford Glass Co., Toledo, Ohio.

**Thermopaste**—Plastic Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

**Thermos**—Gravity Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

**Thermu-Drip**—Humidifier. Automatic Humidifier Co., Cedar Falls, Ia.

**Thor**—Arc Welders. Commonwealth Mfg. Corp., Cincinnati, O.

**Thor**—Electric Buffers. Independent Pneumatic Tool Co., Chicago.

**Thor Drillmaster**—Electric Drills. Independent Pneumatic Tool Co., Chicago.

**370 Special**—Paints. Thompson & Co., Pittsburgh, Pa.

**Threplex**—Flashing. Chase Brass & Copper Co., Inc., Waterbury, Conn.

**Thriftsteel**—Furnaces. Round Oak Co., Dowagiac, Mich.

**Thrift-T-Heat**—Oil Burners. Westchester Home Equipment Co., Inc., Bronx, N. Y.

**Throway**—Filters. American Air Filter Co., Inc., Louisville, Ky.

**Tik Wheat**—Pipe Covering Paste. Clark Stak-O Corp., Rochester, N. Y.

**Tillers - all - Welded**—Furnaces. Iowa Foundry Co., Sioux City, Iowa.

**Timercoid**—Time Clock. Mercoid Corp., Chicago, Ill.

**Timetrol**—Switches. Penn Electric Switch Co., Goshen, Ind.

**Tin-Ezy**—Soldering Flux. Alumaweld Co. of America, Chicago, Ill.

**Tin-It**—Retinning Compound. Geo. B. Klee Co., Cincinnati.

**Tin Loy**—Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, O.

**Tinol**—Compounds and Soldering Flux. American Solder & Flux Co., Philadelphia, Pa.

**Titan**—Furnaces. Standard Fdry. & Furnace Co., DeKalb, Ill.

**Titelock**—Fittings and Accessories for Conductor, Eaves Trough and Gutter, Furnace Pipe; Copper Roofing; Metal Shingles and Tile. Milcor Steel Co., Milwaukee.

**Tobin Bronze**—Welding Rod. American Brass Co., Waterbury, Conn.

**Tomb Brand**—Insulation. Barrett Co., New York City.

**Toncan**—Plates, Ridge Rolls and Ridging, Roofing, Sheets. Republic Steel Corp., Cleveland, O.

**Toolweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Toridheat**—Oil Burners. Cleveland Steel Products Corp., Cleveland, O.

**Tornado**—Furnace Vacuum Cleaners. Breuer Electric Mfg. Co., Chicago.

**Torpedo**—Skylights. Milcor Steel Co., Milwaukee, Wis.

**Torrid**—Soldering Furnaces and Torches. Geo. W. Diener Mfg. Co., Chicago.

**Torrid Zone**—Furnaces, Heaters. Lennox Furnace Co., Marshalltown, Ia.



**Torrid-Zone Aire-Flo**—Stoker-Fired Air Conditioning Furnace. Lennox Furnace Co., The, Marshalltown, Iowa.

**Townley**—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.

**Transite**—Pipe and Fittings. Johns-Manville, New York City.

**Trans-Lux Metallic**—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn.

**Transweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

**Triflex**—Thermostatic Bimetals. General Plate Co., Attleboro, Mass.

**Triple Drain**—Channel Roofing. Republic Steel Corp., Cleveland, Ohio.

**Triplex**—Furnaces. Home Furnace Co., Holland, Mich.

**Triplife**—Furnaces. Williamson Heater Co., Cincinnati, O.

**Triptrol**—Controls. White Mfg. Co., St. Paul, Minn.

**Trojan**—Stokers. Auburn Burner Co., Auburn, Ind.

**Tropico**—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

**Tropico**—Humidifiers. Roberts-Hamilton Co., Minneapolis, Minn.

**Tuffnell**—Paint. Westinghouse Electric & Mfg. Co., East Pittsburgh.

**Tuf-On**—Enamels and Lacquers. Wipe-On Corp., New York City.

**Tungar**—Arc Welder. General Electric Co., Schenectady, N. Y.

**Turret**—Water Circulating Pumps. Yeomans Bros. Co., Chicago.

**Twin-Fyre**—Oil Burners. Aldrich Co., Peoria, Ill.

**Twin Zephyr**—Humidifier. Maid-O'-Mist, Inc., Chicago, Ill.

## U

**U. S.**—Faces, Pipe Fittings, and Registers. United States Register Co., Battle Creek, Mich.

**U. S.**—Skylights and Roof Fan Ventilators. J. K. Mohler Co., Ephrata, Pa.

**U. S. Airco**—Night Air Cooling Fans and Air Washers. U. S. Air Conditioning Corp., Minneapolis.

**USG**—Roofing. United States Gypsum Co., Chicago, Ill.

**USS**—Roofing, Sheets. Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

**U. S. S. Columbia**—Roofing, Sheets. Columbia Steel Co., San Francisco.

**U-Loy**—Sheets. Republic Steel Corp., Cleveland, O.

**Uniblade**—Blowers. Autovent Fan & Blower Co., Chicago, Ill.

**Unicool**—Air Conditioning Units and Washers. Betz Air Conditioning Corp., Kansas City, Mo.

**Uni-Fin**—Grilles and Warm Air Registers. Barber-Colman Co., Rockford, Ill.

**Uni-fo**—Grilles and Registers. Barber-Colman Company, Rockford, Ill.

**Unilectric**—Fans. Midwest Ventilating Works, Milwaukee, Wis.

**Uniloy**—Stainless Steel Sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.

**Unimatic**—Air Filters. American Air Filter Co., Inc., Louisville, Ky.

**Unipack**—Blowers. American Machine Products Co., Marshalltown, Iowa.

**Unishear**—Power Shears. Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

**Unisorb**—Bases and Pads and Duct Insulation. Felters Co., Inc., Boston.

**Unitaires**—Air Conditioning Units for Stores. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

**Universal**—Air Filters. Hugo Mfg. Co., Duluth, Minn.

**Universal**—Blowers, Fans. Ilg Electric Ventilating Co., Chicago, Ill.

**Universal**—Dial Damper. Parker-Kalon Corp., New York City.

**Universal**—Hand Snips and Shears. Rupp Forge & Shear Co., Cleveland.

**Universal**—Pillow Blocks. Randall Graphite Products Corp., Chicago.

**Unxld**—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

**Upson**—Rivets. Republic Steel Corp., Cleveland, O.

**Utilus**—Kitchen Exhaust and Ventilating Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

## V

**"V" Crimp**—Roofing. W. R. Ames Co., San Francisco, Cal.

**Vacalox**—Damper Regulators. Young Regulator Co., Cleveland, O.

**Valley Forge**—Cement. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

**Vaporator**—Humidifiers. Rudy Furnace Co., Dowagiac, Mich.

**Variptich**—Fans. Torrington Mfg. Co., Torrington, Conn.

**Vee-Clip**—Stainless Roof Fastening Clips. National Stainless Clip Corporation, New York City.

**Velometer**—Anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.

**Ventura**—Fans, Ventilators. American Blower Corp., Detroit, Mich.

**Venturi-Flo**—Air Diffusers. Barber-Colman Company, Rockford, Ill.

**Vernalloy**—Furnace Metal. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

**Vernois**—Furnaces. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

**Vibracork**—Bases. Armstrong Cork Co., Lancaster, Pa.

**Victor**—Blower-Filter Units, Furnaces, Humidifiers, Stokers. Hall-Neal Furnace Co., Indianapolis, Ind.

**Victor**—Portable Electric Drills. Stanley Electric Tool Div., Stanley Works, New Britain, Conn.

**Victorroll**—Air Conditioning Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.

**Victory**—Oil Burners. Caloroll Burner Corp., Hartford, Conn.

**Vitra Carlite**—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn.

**Vitroliner**—Vent and Flue Pipe and Fittings. Condensation Engineering Corp., Chicago.

**Vortex**—Furnace Vacuum Cleaners. B. F. Sturtevant Co., Hyde Park, Boston, Mass.

**Vulcanite**—Roofing, Roofing Cement and Paint. Certain-teed Products Corp., New York, N. Y.

**Vulcatex**—Caulking and Glazing Compounds. A. C. Horn Co., Long Island City, N. Y.

**Vulco**—V-type Belts. Gates Rubber Co., Denver, Colo.

## W

**Wafer**—Filters. American Air Filter Co., Inc., Louisville, Ky.

**Walton**—Filters. Research Products Corp., Madison, Wis.

**Warco**—Refractories. Walsh Refractories Corp., St. Louis, Mo.

**Waterbase**—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.

**Water-Boy**—Humidifier Valves. Maid-O'-Mist, Inc., Chicago, Ill.

**Waterbury**—Heaters. Waterman-Waterbury Co., Minneapolis.

**Waterbury Comfortrol**—Oil and Stoker Fired Furnaces. Waterman-Waterbury Co., Minneapolis.

**Waterbury Gastite**—Coal Furnaces. Waterman-Waterbury Co., Minneapolis.

**Waterbury Seamless**—Oil and Stoker-Fired Furnaces. Waterman-Waterbury Co., Minneapolis.

**Waterseal**—Cement, Paint. Thompson & Co., Pittsburgh, Pa.

**Watertender**—Humidifier Valve. J. L. Skuttle Co., Detroit, Mich.

**Wearweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

**Wearwell**—Paint. Thompson & Co., Pittsburgh, Pa.

**Weathermaker**—Air Conditioning Units. Carrier Corp., Syracuse, N. Y.

**Weathermaster**—Air Conditioning Units, Boiler Type. Carrier Corp., Syracuse, N. Y.

**Weather Master**—Air Conditioning Units. U. S. Pressed Steel Products Co., Kalamazoo, Mich.

**Weather Stabilizer**—Furnaces, Heaters. Des Moines Steel Furnace Co., Des Moines, Ia.

**Weatherwood**—Insulation. United States Gypsum Co., Chicago, Ill.

**Wedgbelt**—Pulleys. American Pulley Co., Philadelphia, Pa.

**Weir**—Air Conditioning Furnaces, Heaters, Stokers. Meyer Furnace Co., Peoria, Ill.

**Weisco**—Skylight Lifts, Snips and Shears. H. Weiss & Co., New York, N. Y.

**Weldit**—Torches, Oxy-Acetylene Welding Equipment. Welding Apparatus Co., Chicago, Ill.

**Weldite**—Electrodes and Welding Rod. Chicago Steel & Wire Co., Chicago.

**Weldon**—Wood Burning Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

**Weld-o-trol**—Spot Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh.

**Wellsville Savage**—Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

**Wesco**—Furnaces. John Westwick & Son, Inc., Galena, Ill.

**Westco**—Pumps. Micro-Westco, Inc., Bettendorf, Ia.

**Westernaire**—Desert Coolers. Western Engineering & Mfg. Co., Los Angeles.

**Western Fan**—Roof Fan Ventilators. Western Engineering & Mfg. Co., Los Angeles.

**Western King**—Furnaces. Independence Stove & Furnace Co., Independence, Mo.

**Westrite**—Furnaces. Western Furnaces, Inc., Tacoma, Wash.

**Wheco**—Oil Burners. Westchester Home Equipment Co., Inc., Bronx, N. Y.

**Whirlator**—Oil Burners. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

**White Flash**—Electrodes. Central Steel & Wire Co., Chicago, Ill.

**Whitney-JENSEN**—Power Brakes. Whitney Metal Tool Co., Rockford, Ill.

**Wiechart**—Furnaces, Heaters. St. Clair Foundry Corp., Centralia, Ill.

**Wildergloss**—Smoke Pipe and Fittings. Wilder Mfg. Co., Niles, Ohio.

**Wilson**—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

**Winair**—Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**Wind Electric**—Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

**Wind-O-Vane Jr.**—Kitchen Exhaust Fans. B. F. Sturtevant Co., Hyde Park, Mass.

**Windowstat**—Condensation Control. Julien P. Friez & Sons, Baltimore.

**Winkler**—Stokers. U. S. Machine Corporation, Lebanon, Ind.

**Winner**—Registers. Auer Register Co., Cleveland, O.

**Winter-Chaser**—Furnaces, Heaters. Campbell Heating Co., Des Moines, Ia.

**Winter King**—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

**Wissco**—Grilles. Wickwire Spencer Steel Co., New York City.

**Wizard**—Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

**Wolverine**—Fans, Blades, Ventilators and Washers. Belanger Fan & Oven Co., Detroit.

**Wolverine**—Furnaces. Marshall Furnace Co., Marshall, Mich.

**Wolverine**—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.

## X

**XL**—Metal Windows. Herrmann & Grace Co., Brooklyn, N. Y.

**X-L-All**—Coils, Furnaces. Deshler Foundry & Machine Works, Deshler, O.

**Xlt**—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

## Y

**Yager's**—Flux. Alex R. Benson Co., Inc., Hudson, N. Y.

**Yankee**—Damper Clips and Tips. S. M. Howes Co., Charlestown, Boston.

**Yoloy**—Alloy Plates and Sheets. Youngstown Sheet & Tube Co., Youngstown, O.

## Z

**Zeph-O-Lator**—Air Conditioning Furnaces. Century Engineering Corp., Cedar Rapids, Ia.

**Zephyr**—A. C. Stoker Furnace. Premier Furnace Co., Dowagiac, Mich.

**Zephyr-air**—Fans. Gas City Glass Co., Gas City, Ind.

**Zero**—Furnace Cement and Refractories. Standard Fuel Engineering Co., Detroit, Mich.

**Zerobestos Black Beauty**—Duct Insulation. Standard Fuel Engineering Co., Detroit.

**Zinogrip**—Steel Sheets. American Rolling Mill Co., Middletown, O.

**Zincoat**—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

**Z-No King**—Furnaces. Oakland Foundry Co., Belleville, Ill.

Section of  
**American Artisan**  
**1939 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL  
AIR CONDITIONING AND SHEET METAL PRODUCTS**

[Section 3—MANUFACTURERS' ADDRESSES]

**A**

- A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, Ill.
- Abbott Mfg. Co., Box 150, Painesville, O.
- Accurate Mfg. Works, 2336-38 Milwaukee Ave., Chicago, Ill.
- Accurate Metal Weather Strip Co., 216 E. 26th St., New York City.
- Ace Engineering Co., 1735 W. 31st St., Chicago, Ill.
- Acer & Whedon, Inc., Commercial St., Medina, N. Y.
- Acme Asbestos Covering & Flooring Co., 218 Elizabeth St., Chicago, Ill.
- Acme Electric Welder Co., 5619 Pacific Blvd., Huntington Park, Cal.
- Acme Heating & Ventilating Co., 4224 S. Lowe Ave., Chicago, Ill.
- Acme Oil Burner Co., Inc., 210 Third Ave., S. W., Cedar Rapids, Ia.
- Acme Refining Co., W. 56th & W. & L. E. Ry., Cleveland, O.
- Acme Tin Plate & Roofing Supply Co., 10th & York St., Philadelphia, Pa.
- Acorn Refining Co., 3001 Franklin Blvd., Cleveland, Ohio.
- Adams Co., E. 4th St. Ext., Dubuque, Ia.
- Adjustable Bearing Plate Co., 11 Rutger St., St. Louis, Mo.
- Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago, Ill.
- Advance Appliance Co., 808-810 Washington St., Peoria, Ill.
- Advance Electric Co., 1260 W. 2nd St., Los Angeles.
- Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
- Advanced Refrigerating Systems Co., 33rd & Arch Sts., Philadelphia, Pa.
- Aeolus Dickinson, 3332-52 S. Artesian Ave., Chicago, Ill.
- Aerofin Corp., 410 S. Geddes St., Syracuse, N. Y.
- Aeroli Burner Co., Inc., Park Ave. at 13th St., West New York, N. J.
- Aerovent Fan Co., 710 E. Ash St., Piqua, O.
- Agnew Electric Welder Co., Milford, Mich.
- Agricola Furnace Co., Inc., North 12th St., Gadsden, Ala.
- Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
- Air Conditioning Equipment Co., 301 N. Seventh St., Minneapolis, Minn.
- Air Conditioning Products Co., 1230 Eighteenth St., Detroit, Mich.
- Air Conditioning Supply Co., 4060 Superior Ave., Cleveland, Ohio.
- Air Control Products, Inc., 100 E. Broadway, Muskegon, Mich.
- Air Controls, Inc., 9205 Detroit Ave., Cleveland, O.
- Aircraft Mfg. Co., 418 E. First St., Dayton, Ohio.
- Air Devices Corp., 70 Britannia St., Meriden, Conn.
- Aire-Folle Fan & Blower Co., 4737 W. Verner Highway, Detroit, Mich.
- Airgard Manufacturing Co., 609 N. La Salle St., Chicago, Ill.
- Airmaster Corp., 140 S. Dearborn St., Chicago, Ill.
- Air-Maze Corp., 5200 Harvard Ave., Cleveland, O.
- Air-n-Oil Burners and Heating Utilities, Inc., 449 Senator St., Brooklyn, N. Y.
- Air-O-Cell Industries, Inc., 14360 Livernois Ave., Detroit.
- Air Reduction Sales Co., 60 E. 42nd St., New York City.
- Airtemp Div. of Chrysler Corp., Leo St., Dayton, Ohio.
- Airtherm Mfg. Co., 1474 S. Vandeventer Ave., St. Louis, Mo.
- Aladdin Heating Corp., 5107 Broadway, Oakland, Cal.
- Alco Valve Co., Inc., 2628 Big Bend Blvd., St. Louis, Mo.
- Aldrich Co., 106 Hamilton St., Peoria, Ill.
- Aldrich Pump Co., Foot of Pine St., Allentown, Pa.
- Alfol Insulation Co., Inc., 155 E. 44th St., New York City.
- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
- Allen Co., L. B., 6719 Bryn Mawr Ave., Chicago, Ill.
- Allen Corp., 9752 Erwin, Detroit, Mich.
- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Allis Co., Louis, 427 E. Stewart St., Milwaukee, Wis.
- Allmetal Weatherstrip Co., 229 W. Illinois St., Chicago, Ill.
- All States Roofers Equipment & Material Co., 2107 W. Lake St., Chicago, Ill.
- Alter-Arc Mfg. Co., 209 B St., Lawton, Okla.
- Alton Mineral Wool Insulation Co., P. O. Box 268, Alton, Ill.
- Alumaweld Co. of America, 2442-44 South Parkway, Chicago, Ill.
- Aluminum Aircell Insulation Co., 415 Curtis Bldg., Detroit.
- Aluminum Company of America, 801 Gulf Bldg., Pittsburgh, Pa.
- American Air Conditioning Co., 2831 Thirteenth Ave., Minneapolis, Minn.
- American Air Conditioning Corp., P. O. Box 29, Sebastopol, Cal.
- American Air Filter Co., Inc., 113 Central Ave., Louisville, Ky.
- American Barlock Co., Inc., 36-32 38th St., Long Island City, N. Y.
- American Blower Corp., 6000 Russell St., Detroit, Mich.
- American Brass Co., 414 Meadow St., Waterbury, Conn.
- American Cabinet Hardware Corp., Rockford, Ill.
- American Chemical Paint Co., Brookside Ave., Ambler, Pa.
- American Chain Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.
- American Coal Burner Co., 155 E. Superior St., Chicago, Ill.
- American Coolair Corp., 3604 Mayflower St., Jacksonville, Fla.
- American Coppercote, Inc., 189 Montague St., Brooklyn, N. Y.
- American Engineering Co., Aramingo Av. & Cumberland St., Philadelphia.
- American Flange & Mfg. Co., Inc., 1901 R. C. A. Bldg., Radio City, New York City.
- American Foundry & Furnace Co., 915 E. Washington St., Bloomington, Ill.
- American Furnace Co., 2719-31 Delmar Blvd., St. Louis, Mo.
- American Furnace & Foundry Co., Milan, Mich.
- American Gas Products Division of American Radiator Co., 40 W. 40th St., New York City.
- American Hair & Felt Co., 222 N. Bank Dr., Chicago, Ill.
- American Instrument Co., Silver Springs, Md.
- American Insulator Corp., New Freedom, Pa.
- American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh, Pa.
- American Machine Products Co., 207-11 Market St., Marshalltown, Ia.
- American-Marsh Pumps, Inc., 60 Capital Ave., N. E. Battle Creek, Mich.
- American Metal Hose Branch, American Brass Co., 67 Jewell St., Waterbury, Conn.
- American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids, Mich.
- American Nickeloid Co., 1505 Second St., Peru, Ill.
- American Oil Burners & Heating Utilities, 4511 Fourth Ave., Brooklyn, N. Y.
- American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.
- American Radiator Co., 40 W. 40th St., New York City.
- American Rolling Mill Co., 703 Curtis St., Middletown, O.
- American Screw Co., 21 Stevens St., Providence, R. I.
- American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
- American Solder & Flux Co., 4519 Wayne Ave., Philadelphia, Pa.
- American Steel Co., 1330 Park Bldg., Pittsburgh, Pa.
- American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.
- American Warming & Ventilating Co., Toledo, Ohio.
- American Welding & Engineering Corp., Milwaukee, Wis.
- American Wood Register Co., Novelty & Walnut Sts., Plymouth, Ind.
- American Zinc Products Co., Greencastle, Ind.
- Ames Co., W. R., 150 Hooper St., San Francisco, Cal.
- Amirton Co., 60 E. 42nd St., New York City.
- Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore, Md.
- Anchor Stove and Range Co., Third & Culbertson, New Albany, Ind.
- Anderson Mfg. Co., 511 3rd, Des Moines, Ia.
- Andes Range & Furnace Corp., 117 Evans St., Geneva, N. Y.
- Andrews Lead Co., Inc., 30-48 Greenpoint Ave., Long Island City, N. Y.
- Anemostat Corporation of America, 10 East 39th St., New York City.
- Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, O.

● Advertisement in this issue. See Index to Advertisers, page 168.



Annis Air Filters, 1515 Gardena Ave., Glendale, Cal.  
 ●Anthraxite Industries, Inc., Chrysler Building, New York City.  
 Anti-Corrosive Metal Products Co., Inc., P. O. Box 788, Albany, N. Y.  
 Antigo Building Supply Co., Antigo, Wis.  
 Apex Rotarex Corp., 1070 E. 152nd St., Cleveland, Ohio.  
 Apollo Metal Works, 66th & S. Oak Park Ave., Clearing Sta., Chicago.  
 Apollo Steel Co., 609-617 Warren Ave., Apollo, Pa.  
 Arco Cooling Fan Div., American Radiator Co., 40 W. 40th St., New York City.  
 Arco Vacuum Corp., 40 W. 40th St., New York City.  
 Arcweld Mfg. Co., Inc., 3469 Third Ave. W., Seattle, Wash.  
 Arex Co., 333 N. Michigan Ave., Chicago, Ill.  
 Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago, Ill.  
 ●Armstrong Co., South & Post St., Detroit, Mich.  
 Armstrong Cork Co., 992 Concord St., Lancaster, Pa.  
 Armstrong Furnace Co., 1649 Olentangy River Rd., Columbus, O.  
 Asphalt Products Co., Eastwood Sta., Syracuse, N. Y.  
 Associated Heater Parts Co., 3101 Wentworth Ave., Chicago, Ill.  
 ●Atcheson Glass Co., T. J., 955 Main St., Buffalo, N. Y.  
 Athens Flow Co., Athens, Tenn.  
 Athey Co., 1923 S. Calumet, Chicago, Ill.  
 Atlas Bolt & Screw Co., 1130 Ivanhoe Rd., Cleveland, O.  
 Atlas Heating & Ventilating Co., Ltd., 557 4th St., San Francisco, Cal.  
 Atlas Valve Co., 282 South St., Newark, N. J.  
 Auburn Burner Company, Auburn, Ind.  
 Auburn Stoker Co., Auburn, Ind.  
 ●Auer Register Co., 3608 Payne Ave., Cleveland, O.  
 Autocrat Oil Burner Corp., 100 East Ave., N. W., Cedar Rapids, Ia.  
 Autogas Corporation, 2258 Diversey Ave., Chicago.  
 Auto-Heat Corporation, 311 W. 66th St., New York City.  
 Automatic Burner Corp., 1823 Carroll Ave., Chicago, Ill.  
 Automatic Gasflux Co., Frankfort Ave., Cleveland, O.  
 ●Automatic Humidifier Co., 19th & Main Sts., Cedar Falls, Ia.  
 Automatic Products Co., 2452 N. 32nd St., Milwaukee, Wis.  
 Automatic Stoker Corp., Indianapolis, Ind.  
 Automatic Switch Co., 41 E. 11th St., New York City.  
 Automatic Temperature Control, Inc., 101 Park Ave., New York City.  
 ●Autovent Fan & Blower Co., 1807-19 N. Kostner Ave., Chicago, Ill.

## B

Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa.  
 Badger Mfg. Co., 106 N. Frances St., Madison, Wis.  
 Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland, O.  
 Baker Furnace & Cleaner Mfg. Co., 2505 Albion St., Toledo, Ohio.  
 ●Baker Ice Machine Co., Inc., 1509 Evans St., Omaha, Nebr.  
 Baldor Electric Co., 4358 Duncan Ave., St. Louis, Mo.  
 Baldwin-Hill Company, 527 Klagg Ave., Trenton, N. J.  
 Ballard, Inc., Arthur H., 535 Commonwealth Ave., Boston, Mass.  
 Balloffett Dies & Nozzle Co., Inc., 45-51 Adams St., Guttenberg, N. J.  
 Bangor-Washington Slate Co., Bangor, Pa.  
 Banner Repair Parts Co., 103 E. Indianola Ave., Youngstown, Ohio.  
 Barber Co., Inc., 1600 Arch St., Philadelphia, Pa.  
 Barber-Colman Co., River & Loomis Sts., Rockford, Ill.  
 ●Barber Gas Burner Co., 3704 Superior Ave., Cleveland, O.  
 Barclay, Inc., Robt., 128 N. Peoria St., Chicago, Ill.  
 Bard Mfg. Co., Evansport Road, Bryan, Ohio.  
 Bards Range & Foundry Co., E. H., 2619 Colerain Ave., Cincinnati, O.  
 Barnes Metal Products Co., 4425 W. 16th St., Chicago, Ill.  
 Barnes, W. O., 1297 Terminal Ave., Detroit.  
 Barrett Co., 40 Rector St., New York City.  
 Barrett Engineers, 1322 Warrensville Center Rd., Cleveland Heights, O.  
 Barrett Mfg. Co., 308 S. West Blvd., Kansas City, Mo.  
 Barry Furnace Co., 208 N. B. St., Hamilton, O.  
 Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit, Mich.  
 Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill.  
 Bayer Co., A. J., Slauson & Santa Fe Aves., Los Angeles, Cal.  
 Bayley Blower Co., 1817 S. 66th St., Milwaukee, Wis.  
 Beacon-Morris Corp., 702 Beacon St., Boston, Mass.  
 ●Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport, Conn.  
 Beatrice Steel Tank Mfg. Co., 700-710 S. 7th St., Beatrice, Nebr.  
 Beatty Machine & Mfg. Co., 932 150th St., Hammond, Ind.  
 Beck Engineering Combustion Kompany, 3033 Adams St., St. Louis, Mo.  
 Beckett Engineering Co., R. W., Elyria, Ohio.  
 Beckett Perforating Co., 315 North Ave., Garwood, N. J.  
 Bedard Mfg. Co., 1647 Hennepin Ave., Minneapolis, Minn.  
 Belanger Fan & Oven Co., 1230 18th St., Detroit.

Bell & Gossett Co., 3000 Wallace St., Chicago, Ill.  
 Belmont Smelting & Refining Works, Inc., 341 Belmont Ave., Brooklyn, N. Y.  
 Bender Warrick Corp., 131 Pierce, Birmingham, Mich.  
 Benjamin Elec. Mfg. Co., Des Plaines, Ill.  
 Bennett Company, 1109 Harney St., Omaha, Nebr.  
 Benson Co., Inc., Alex R., 1040 S. Bay Rd., Hudson, N. Y.  
 ●Berger Bros. Co., 229-237 Arch St., Philadelphia, Pa.  
 Berger Mfg. Div. of Republic Steel Corp., 1038 Belden Ave., N. E., Canton, O.  
 Bergstrom Mfg. Corp., Neenah, Wis.  
 Berns Specialty Company, 1015 W. Lake St., Chicago, Ill.  
 Bernz Co., Inc., Otto, 280 Lyell Ave., Rochester, N. Y.  
 Berry, Jr., F. E. & Co., Inc., Spring St., Everett, Mass.  
 Berryman Oil Burner Co., 1304 Washington Blvd., Chicago, Ill.  
 Bersted Co., Martin, 1271 N. Hermitage Ave., Chicago.  
 Bertram Mfg. Co., 646 N. Michigan Ave., Chicago, Ill.  
 Bertsch & Co., Church St., Cambridge City, Ind.  
 Best Register Co., 2005 W. Oklahoma Ave., Milwaukee, Wis.  
 Bethlehem Foundry & Machine Co., Brodhead Ave. & Second St., Bethlehem, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Betz Air Conditioning Corp., 1820 Wyandotte, Kansas City, Mo.  
 ●Beverly Throatless Shear Co., 3009 W. 110th Pl., Chicago, Ill.  
 Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee, Wis.  
 Bignall Co., 621-623 Main St., Medina, N. Y.  
 Binkley Mfg. Co., Warrenton, Mo.  
 Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.  
 Bird & Son, Inc., 163 Washington St., East Walpole, Mass.  
 Birmingham Fan Mfg. Co., Birmingham, Ala.  
 Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland, O.  
 Bishop Humidifier Co., 8011 Dexter Blvd., Detroit, Mich.  
 Bitner Engineering Co., 18-32 E. 135th St., New York City.  
 Black & Decker Mfg. Co., Pennsylvania Ave., Towson, Md.  
 ●Blake & Johnson Co., Waterville, Conn.  
 Bliss Co., E. W., 1420 Hastings St., Toledo, O.  
 ●Blocksom & Company, East Fifth St., Michigan City, Ind.  
 Bluffton Mfg. Co., 433 W. Main Cross St., Findlay, O.  
 Blower Application Company, 918 N. Fourth St., Milwaukee, Wis.  
 Bodine Electric Co., 2272 W. Ohio St., Chicago, Ill.  
 Bohn Aluminum & Brass, Michigan Ave. & Shelby St., Detroit.  
 Bollaert, M., 3936 Rhoda Ave., Oakland, Cal.  
 Bossert Company, Inc., 1800 Lenox Ave., Utica, N. Y.  
 Bostwick-Goodell Co., Norwalk, O.  
 Boyd & Co., Inc., Chas. P., Tasker & Water Sts., Philadelphia, Pa.  
 Braden Engineering, Inc., 896 Elmwood Ave., Providence, R. I.  
 Braden Mfg. Co., 431 N. 14th St., Terre Haute, Ind.  
 Brasco Mfg. Co., Harvey, Ill.  
 ●Brauer Supply Co., A. G., 316 N. Third St., St. Louis, Mo.  
 ●Bremil Mfg. Co., Box 1030, Erie, Pa.  
 ●Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago, Ill.  
 Brex & Bieler, Inc., 45th St. nr. 1st Ave., Brooklyn, N. Y.  
 Bridesburg Foundry Co., Tacony & Duncan Sts., Philadelphia, Pa.  
 Bridgeport Brass Co., E. Main St., Bridgeport, Conn.  
 Bridgeport Chain & Mfg. Co., 964 Crescent Ave., Bridgeport, Conn.  
 Bridgeport Screw Co., Bridgeport, Conn.  
 Brigham Oil Burner Co., 2915 Clark Ave., St. Louis, Mo.  
 Brillion Furnace Co., Brillion, Wis.  
 Bristol Co., Platts Bridge, Waterbury, Conn.  
 Brooklyn Metal Ceiling Co., 283-89 Greene Ave., Brooklyn, N. Y.  
 Bros Boller & Mfg. Co., Wm., Nicollet Island, Minneapolis, Minn.  
 Brown-Brockmeyer Co., Inc., 1098 Smithville Rd., Dayton, O.  
 Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., 4443 Wayne Ave., Philadelphia.  
 Brown Oil Burning Equipment Co., 312-314 Massachusetts Ave., Cambridge, Mass.  
 Brownell Co., N. Findlay St., Dayton, O.  
 ●Brumme Mfg. Co., 314 S. Artesian Ave., Chicago, Ill.  
 Brundage Co., 246 W. Kalamazoo Ave., Kalamazoo, Mich.  
 Brunner Mfg. Co., 1821 Broad St., Utica, N. Y.  
 Bryan Steam Corp., P. O. Box 337, Peru, Ind.  
 Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland, O.  
 Bryant Heater Co., 17825 St. Clair Ave., Cleveland, O.  
 Buckeye Products Co., 7024 Vine St., Cincinnati, O.  
 Budke Stamping Co., P. O. Box 96, Canonsburg, Pa.  
 ●Buffalo Forge Co., 497 Broadway, Buffalo, N. Y.  
 Buffalo Pumps, Inc., 171 Mortimer St., Buffalo, N. Y.  
 Builders Iron Foundry, 11 Coddling St., Providence, R. I.  
 Burdett Mfg. Co., 19 N. Sheldon St., Chicago, Ill.  
 Burgess Battery Co., 500 W. Huron St., Chicago, Ill.  
 Burgess Soldering Furnace Co., 292 E. Long St., Columbus, O.

●Advertisement in this issue. See Index to Advertisers, page 168.

Burke Electric Co., 1201 W. 12th St., Erie, Pa.  
 Burmester Gas Furnace Mfg. Co., 2117 Cumming St., Omaha, Nebr.  
 Burnham Boiler Corp., 1 Main St., Irvington, N. Y.  
 Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.  
 Burnley Battery & Mfg. Co., Clay St., North East, Pa.  
 Burnwell Corp., 125 N. Church St., Allentown, Pa.  
 Burt Mfg. Co., 301 Main St., Akron, Ohio.  
 Bush Mfg. Co., 100 Wellington St., Hartford, Conn.  
 Butler Mfg. Co., 13th & Eastern, Kansas City, Mo.  
 Butler Street Foundry & Iron Co., 3422 Normal Ave., Chicago, Ill.  
 Butterworth, Jr., B. T., Oak Street, New Canaan, Conn.  
 Byers Co., A. M., Clark Bldg., Pittsburgh, Pa.

## C

Cabot, Inc., Samuel, 141 Milk St., Boston, Mass.  
 Calbar Paint & Varnish Co., 2620 N. Martha St., Philadelphia, Pa.  
 Caldwell, Farley M., 6th & Harrison Sts., Fort Wayne, Ind.  
 ●Calesco Corporation, 294 Broad St., Lynn, Mass.  
 California Cornice, Steel and Supply Corp., 1620 N. Spring St., Los Angeles, Cal.  
 California Wire Cloth Co., 1001 22nd Ave., Oakland, Cal.  
 Calkins & Pearce, 203-205 E. Long St., Columbus, O.  
 Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.  
 Callite Product Co., 540 39th St., Union City, N. J.  
 Caloroli Burner Corp., 1477 Park St., Hartford, Conn.  
 Campbell, Andrew C., Division of American Chain & Cable Co., Inc., Bridgeport, Conn.  
 Campbell Heating Co., 31st and Dean, Des Moines, Ia.  
 Campbell Heating Co., E. K., 2445 Charlotte St., Kansas City, Mo.  
 Campbell Machine Co., 2845 Harriet Ave., Minneapolis.  
 ●Canatsey Electric Manufacturing Co., 620 Wyandotte, Kansas City, Mo.  
 Canton Steel Ceiling Mfg. Co., 2280 Winfield Way, S. E., Canton, O.  
 Canton Stoker Corp., 507 Andrews Pl., S. W., Canton, O.  
 ●Capitol Furnace & Stove Repair, 229 S. Meridian St., Indianapolis, Ind.  
 Carbo-Oxygen Co., 221-223 Fourth Ave., Pittsburgh, Pa.  
 Carey Co., Philip, Wayne Ave., Cincinnati, O.  
 Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh, Pa.  
 Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.  
 Carrier Corp., 302 S. Geddes St., Syracuse, N. Y.  
 Carter Paint Co., 310 N. Main St., Liberty, Ind.  
 Cary Mfg. Co., Waupaca, Wis.  
 Cash Universal Register Co., Marshalltown, Iowa.  
 Cellulose Corporation of New Jersey, 6565 S. Laverne Ave., Chicago.  
 Celotex Corp., 919 N. Michigan Ave., Chicago, Ill.  
 ●Central Furnace & Stove Repair Co., 3937 Olive St., St. Louis, Mo.  
 Central Steel & Wire Co., 4545 S. Western Blvd., Chicago.  
 Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.  
 ●Century Electric Co., 1806 Pine St., St. Louis, Mo.  
 Century Engineering Corp., Cor. Fourth Ave. & Third St. Cedar Rapids, Ia.  
 Century Fan & Ventilator Corp., 314 E. 39th St., New York City.  
 Certain-teed Products Corp., 100 E. 42nd St., New York City.  
 Chace Co., W. M., 1606 Beard Ave., Detroit, Mich.  
 Chain Products Co., 3910 Cooper Ave., Cleveland, O.  
 Chain Tape Venetian Blind Co., Rockford, Ill.  
 Chalmers Oil Burner Co., 1234 Central Ave., Minneapolis, Minn.  
 Chamberlin Metal Weather Strip Co., 1254 La Brosse, Detroit, Mich.  
 Champion Blower & Forge Co., Harrisburg Ave. & Charlotte St., Lancaster, Pa.  
 Champion Furnace Pipe Co., 918 S. Adams St., Peoria, Ill.  
 ●Champion Tool Co., 376 W. 41st Place, Los Angeles, Cal.  
 ●Chandler Co., 804 1st Ave., N. W., Cedar Rapids, Ia.  
 Chapman Clay Co., Zanesville, O.  
 Chapman Slate Co., 546 Main St., Bethlehem, Pa.  
 Char-Gale Mfg. Co., 3127 Hiawatha Ave., Minneapolis, Minn.  
 Chase Brass & Copper Co., Inc., 236 Grand St., Waterbury, Conn.  
 Chelsea Fan & Blower Co., Inc., 370 W. 15th St., New York City.  
 Cheney Co., 1202 Architects Bldg., 17th & Sansom Sts., Philadelphia, Pa.  
 Chicago Air Filter Co., Joliet, Ill.  
 Chicago Automatic Stoker Co., Not Inc., 14 N. Clinton St., Chicago, Ill.  
 Chicago Die Casting Co., 2512 W. Monroe St., Chicago, Ill.  
 Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago, Ill.  
 Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.  
 Chicago Metal Hose Corp., 1300 S. 3rd Ave., Maywood, Ill.  
 ●Chicago Metal Mfg. Co., 3720 S. Rockwell St., Chicago, Ill.  
 Chicago Perforating Co., 2445 W. 24th Pl., Chicago, Ill.

Chicago Pump Co., 2336 Wolfram St., Chicago, Ill.  
 Chicago Rawhide Mfg. Co., 1312 Elston Ave., Chicago, Ill.  
 Chicago Rivet & Mach. Co., 1830 S. 54th Ave., Cicero P. O., Chicago, Ill.  
 Chicago Steel & Wire Co., 103rd St. & Torrence Ave., Chicago, Ill.  
 Chicago Steel Furnace Co., 7934 S. Chicago Ave., Chicago, Ill.  
 Chicago Venetian Blind Co., 3917 S. Michigan Ave., Chicago, Ill.  
 Chinook, Inc., 111 Endicott-Arcade Bldg., St. Paul, Minn.  
 Christensen Machine Co., 1975 S. Second West St., Salt Lake City, Utah.  
 Christie Cleaner Co., Div. of Cincinnati Sheet Metal & Roofing Co., 226-30 E. Front St., Cincinnati, O.  
 Cincinnati Mfg. Co., Gest & Evans Sts., Cincinnati, O.  
 Cincinnati Shaper Co., Hopple, Garrard & Elam, Cincinnati, O.  
 ●Cincinnati Sheet Metal & Roofing Co., 230 E. Front St., Cincinnati, O.  
 Cincinnati Stamping Co., 28-34 W. McMicken Ave., Cincinnati, O.  
 ●Clarage Fan Co., North & Porter Sts., Kalamazoo, Mich.  
 Clark Bros. Bolt Co., Milldale, Conn.  
 Clark Controller Co., 1146 E. 152nd St., Cleveland, O.  
 Clark Jr., Electric Co., Jas., 600 Bergman St., Louisville, Ky.  
 Clark Stek-O Corp., 1631 Dewey Ave., Rochester, N. Y.  
 Clarm Mechanical Devices Co., 410 S. Elizabeth St., Lima, O.  
 Clauss Shear Co., Fremont, O.  
 Clay Equipment Corp., Cedar Falls, Ia.  
 Clayton & Lambert Mfg. Co., 11111 French Rd., Detroit, Mich.  
 Cleveland Brush Factory, Inc., 7115 Dearborn Ave., S. W., Cleveland, O.  
 Cleveland Fire Brick Co., 1740 E. 12th St., Cleveland, O.  
 Cleveland Punch & Shear Works Co., E. 40th & St. Clair Ave., Cleveland, O.  
 Cleveland Steel Products Corp., Toridheet Div., 7306 Madison Ave., Cleveland, O.  
 Clifford Mfg. Co., 564 E. First St., Boston, Mass.  
 Climatemaker Corporation, The, 1804 W. End Ave., Nashville, Tenn.  
 Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.  
 Clough, A. W., 28 S. Broad St., Meriden, Conn.  
 Cocking, Geo. J., 1336 W. 5th St., Santa Ana, Cal.  
 Cole Draft Governor Sales Co., 533 N. La Salle St., Chicago, Ill.  
 Cole-Sullivan Engineering Company, 1316 Third St., North, Minneapolis, Minn.  
 Coleman Lamp & Stove Co., 2nd & St. Francis, Wichita, Kan.  
 Colonial Alloys Company, Sheet & Tube Div., 2154 E. Somerset St., Philadelphia.  
 Columbia Burner Co., 729 Ewing St., Toledo, O.  
 Columbia Mills, Inc., Saginaw, Mich.  
 Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco, Cal.  
 Columbian Enameling & Stamping Co., 1536 Beech St., Terre Haute, Ind.  
 Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus, O.  
 Columbus Metal Products, Inc., 767 N. 4th St., Columbus, O.  
 Combustion Engineering Co., Inc., 200 Madison Ave., New York City.  
 Comet Electric Company, 1237 St. Paul St., Indianapolis, Ind.  
 Commonwealth Mfg. Corp., 4208 Davis Lane, Cincinnati, O.  
 Conco-Sampsel Stoker Corp., Mendota, Ill.  
 ●Condensation Engineering Corp., 335 S. Western Ave., Chicago, Ill.  
 Congress Tool & Die Co., 9034 Lumkin Ave., Detroit, Mich.  
 Connors Paint Mfg. Co., Wm., 669-683 River St., Troy, N. Y.  
 Consolidated Metals Corp., 5531 Woodward Ave., Detroit, Mich.  
 Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.  
 Continental Machine Specialties, Inc., 1301 Washington Ave., South, Minneapolis, Minn.  
 Continental Products Co., 1150 E. 222nd St., Euclid, O.  
 Continental Rubber Works, 1900 Liberty Parkway, Erie, Pa.  
 Continental Screw Co., Mt. Pleasant, New Bedford, Mass.  
 Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.  
 Continental Stove Corp., Front & Walnut, Ironton, O.  
 ●Cook Electric Co., 2700 Southport Ave., Chicago, Ill.  
 Cooper & Cooper, Inc., 37 Penn St., Pittsfield, Mass.  
 Cooper Oven Thermometer Co., Pequabuck, Conn.  
 Copeland Refrigeration Corp., Sidney, Ohio.  
 Copperweld Steel Co., Glassport, Pa.  
 Coppus Engineering Corp., 344 Park Ave., Worcester, Mass.  
 Corbin Screw Corp., 300 High St., New Britain, Conn.  
 Corbman Bros., Inc., 1205 N. Fourth St., Philadelphia, Pa.  
 Cork Import Corp., 330 W. 42nd St., New York City.  
 Cork Insulation Co., Inc., 155 E. 44th St., New York City.  
 Cornell Iron Works, Inc., 36th Ave. & 13th St., Long Island City, N. Y.  
 Cornell Wood Products Co., 230 N. Michigan Ave., Chicago, Ill.  
 Corozone Air Conditioning Corp., 1422 Euclid Ave., 1110 Hanna Bldg., Cleveland, O.  
 Crane Co., 836 S. Michigan Ave., Chicago, Ill.  
 Crary Mfg. Co., 396 N. Second St., Middleport, O.

●Advertisement in this issue. See Index to Advertisers, page 168.



- Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
- Crise Electric Mfg. Co., 316-320 S. Main St., Mt. Vernon, O.
- Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
- Cross Engineering Co., 160-178 Dundaff St., Carbondale, Pa.
- Crouch Corporation, Birmingham, Mich.
- Crowe Name Plate & Mfg. Co., 3710 Ravenswood Ave., Chicago.
- Crown Cork & Seal Co., 4401 Eastern Ave., Baltimore.
- Crown Fuel Saver Co., Richmond, Ind.
- Crown Iron Works, 1229 N. E. Tyler, Minneapolis, Minn.
- Crucible Steel Co. of America, 405 Lexington Ave., New York City.
- Crystal Refrigerator Co., Fremont, Nebr.
- Curtis Refrigerating Machine Co., 1946 Kienlen Ave., St. Louis, Mo.
- Cutler-Hammer, Inc., N. 12th St. and W. St. Paul Ave., Milwaukee, Wis.

## D

- Dall Steel Products Co., 1050 Main St., Lansing, Mich.
- Daniels Mfg. Co., Inc., Sam, Daniels Rd., Hardwick, Vt.
- Danville Stove & Mfg. Co., Beaver St., Danville, Pa.
- Danzer Metal Works Co., 101 W. Lee St., Hagerstown, Md.
- Davenport Mfg. Co., 301 W. College St., Meadville, Pa.
- Davies Air Filter Corp., 390 4th Ave., New York City.
- Day Co., The, 2938 Pillsbury Ave., Minneapolis, Minn.
- Dayton Greenhouse Mfg. Co., P. O. Box 801, Dayton, O.
- Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton, O.
- Dayton Rogers Mfg. Co., 2830 13th Ave., So., Minneapolis, Minn.
- Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton, O.
- Debevoise Co., 968 Grand St., Brooklyn, N. Y.
- De Bothezat Ventilating Equipment Division, American Machine and Metals, Inc., 100 Sixth Ave., New York City.
- Decatur Iron & Steel Co., Decatur, Ala.
- Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
- De Laval Steam Turbine Co., 300 Nottingham Way, Trenton, N. J.
- De La Vergne Engine Co. (Sales Agent for Baldwin-Southwark Corp.), Paschall P. O., Philadelphia, Pa.
- D'Elia Oil Burner Co., Inc., 145 Stratford Ave., Bridgeport, Conn.
- Delco-Frigidaire Conditioning Div., General Motors Sales Corporation, 300 Taylor St., Dayton, O.
- Delco Products Division, General Motors Corp., 329 E. First St., Dayton, O.
- Delta Stoker Co., Foot of Commonwealth, North Chicago, Ill.
- Deming Co., 148 Aetna St., Salem, O.
- Deniston Co., 4856 S. Western Ave., Chicago, Ill.
- Densmore-Quinlan Co., 910 74th St., Kenosha, Wis.
- Deshler Foundry & Machine Works, 140-142 S. East Ave., Deshler, O.
- Des Moines Steel Furnace Co., 509 University Ave., Des Moines, Ia.
- Des Moines Stove Repair Co., 107 S. W. Second St., Des Moines, Ia.
- Detroit Air Meter Co., Box 1473, Detroit, Mich.
- Detroit Lubricator Co., 5900 Trumbull Ave., Detroit, Mich.
- Detroit Michigan Stove Co., 6900 E. Jefferson Ave., Detroit, Mich.
- Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit, Mich.
- Detroit Stamping Co., 3457 W. Fort St., Detroit.
- Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
- Detroit Stoker Co., General Motors Bldg., Detroit, Mich. (Sales & Engineering); Monroe, Mich. (Main Office & Works).
- Detroit Torch & Mfg. Co., 12057 Cardoni Ave., Detroit, Mich.
- De Vilbiss Co., 300 Phillips Ave., Toledo, O.
- Devlin Mfg. Co., Thos., Burlington, N. J.
- Diamond Castings Co., Terra Cotta Rd., Johnsonburg, Pa.
- Diamond Mfg. Co., 243 W. 8th St., Wyoming, Pa.
- Diamond Metal Weather Strip Co., 650 N. 4th St., Columbus, O.
- Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
- Dickson & Eddy, 17 Battery Pl., New York City.
- Dickson Weatherproof Nail Co., P. O. Box 466, Evanston, Ill.
- Dieckmann Co., Ferdinand, 1182 Harrison St., Cincinnati, O.
- Diehl Mfg. Co., Trumbull St., Elizabethport, N. J.
- Diener Mfg. Co., Geo. W., 400 N. Monticello Ave., Chicago, Ill.
- Disston & Sons, Inc., Henry, Unruh & Milner Sts., Tacony Sta., Philadelphia.
- Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
- Doheny Co., John J., 326 Lake St., Belmont, Mass.
- Dowagiac Steel Furnace Co., Beeson St., Dowagiac, Mich.
- Downs-Smith Brass & Copper Co., 304-320 E. 45th St., New York City.
- Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids, Mich.
- Dracco Corp., 4057 E. 116th St., Cleveland, O.
- Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago, Ill.
- Drouve Co., G., 2082 Kings Highway, Fairfield, Conn.

- Dunham Co., C. A., 450 E. Ohio St., Chicago, Ill.
- Dunn, Inc., Struthers, 139 N. Juniper St., Philadelphia, Pa.
- Duo-Therm Div., Motor Wheel Corp., E. May St., Lansing, Mich.
- du Pont de Nemours & Co., E. I., Wilmington, Del.
- Duro Co., 537 E. Monument Ave., Dayton, O.
- Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
- Dwyer Mfg. Co., F. W., 565 W. Washington St., Chicago.
- Dyer Welder & Engineering Co., 1401 Agnes Ave., Kansas City, Mo.

## E

- Eagle-Picher Lead Co., Temple Bar Bldg., Cincinnati, O.
- Eaglesfield Ventilator Co., 920 Dorman St., Indianapolis, Ind.
- Easternoil, Inc., 133 Marginal Way, Portland, Me.
- Eckenroth Register Co., 447 Sutter St. (Pac. G. & E. Bldg.), San Francisco, Cal.
- Eclipse Aviation Corp., 545 N. Arlington Ave., East Orange, N. J.
- Econocol Stoker Division of Cotta Transmission Corp., 2340 11th St., Rockford, Ill.
- Economy Baler Co., 1020 N. Main St., Ann Arbor, Mich.
- Economy Electric Manufacturing Co., 4634 W. 21st Pl., Cicero, Ill.
- Economy Pumps, Inc., 2522 W. Congress St., Chicago.
- Eddy Stoker Corp., 4717 W. North Ave., Chicago, Ill.
- Edison Electrical Controls Division, Thos. A. Edison, Inc., Lakeside Ave., West Orange, N. J.
- Edwards Furnace Co., 25 East Ave., Wellsboro, Pa.
- Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati, O.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Elermann Floor Scraper Co., 1971 Fulton St., Brooklyn, N. Y.
- Elker Mfg. Company, Ogallala, Nebr.
- Elsler Engineering Co., 760 S. 13th St., Newark, N. J.
- Electric Arc Cutting & Welding Co., 152 Jelliff Ave., Newark, N. J.
- Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
- Electric Furnace-Man, Inc., 101 Park Ave., New York City.
- Electric Materials Co., Clay & Washington Sts., North East, Pa.
- Electric Soldering Iron Co., Inc., Deep River, Conn.
- Electric Sprayit Co., 224 N. Broadway, Milwaukee, Wis.
- Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland, O.
- Electric Valve Mfg. Co., Inc., 68 Murray St., New York City.
- Electromatic Corp., 2100 S. Indiana, Chicago, Ill.
- Electroaire Corp., 1455 W. Congress St., Chicago, Ill.
- Electrogas Furnace & Mfg. Co., 2575 Bayshore Blvd., San Francisco, Cal.
- Electrol, Inc., 334 Main Ave., Clifton, N. J.
- Electrovent Corp., 5402 Western Ave., Detroit, Mich.
- Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago, Ill.
- Elgo Shutter & Mfg. Co., 634 W. Warren Ave., Detroit, Mich.
- Ellison Draft Gage Co., 214 W. Kinzie St., Chicago, Ill.
- Elsey Metal Specialties Co., 1535 Spruce St., Detroit, Mich.
- Emerson Electric Mfg. Co., 1843 Washington Ave., St. Louis, Mo.
- Empire Door Co., Inc., 226 E. 144th St., New York City.
- Empire Metal Co., 820 E. Water St., Syracuse, N. Y.
- Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
- Emrich Co., Inc., 312 Broad St., Columbus, O.
- Engineering Research Corporation, 6100 Sligo Mill Road, N. E., Washington, D. C.
- Enterprise Boiler & Tank Works, Inc., 1955 N. Long Ave., Chicago, Ill.
- Enterprise Foundry Co., E. "B" St., Belleville, Ill.
- Erdle Perforating Co., 171 York St., Rochester, N. Y.
- Estate Stove Co., Hamilton, O.
- Evans Corp., George, 121 37th St., Moline, Ill.
- Evans Products Co., Evanoh Heater Div., Detroit.
- Everhot Mfg. Co., 57 S. 19th Ave., Maywood, Ill.
- Evry-Use Products, Inc., 260 Canal St., New York City.
- Excello Oil Heating Corp., 111½ S. 24th St., Omaha, Nebr.
- Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago, Ill.
- Excelsior Stove & Mfg. Co., 504-630 S. Front St., Quincy, Ill.
- Excelsior Tool and Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
- Excelso Products Corp., 65 Clyde Ave., Buffalo, N. Y.

## F

- Fabling Co., W. D., 722 N. Broadway, Los Angeles, Cal.
- Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
- Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.
- Fairfield Oil Heating Co., Inc., Mason St., Greenwich, Conn.
- Fairmont Aluminum Co., Fairmont, W. Va.
- Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.
- Fargo Foundry Co., 92 N. P. Ave., Fargo, N. D.
- Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.
- Farrell-Cheek Steel Company, First & Lane Sts., Sandusky, Ohio.
- Farris Furnace Co., 920-930 Enos Ave., Springfield, Ill.

• Advertisement in this issue. See Index to Advertisers, page 168.



Faultless Heater Corp., 10402 St. Clair Ave., Cleveland, O.  
 Favorite Stove Co., Young & Weber Sts., Piqua, O.  
 Fedders Mfg. Co., 57 Tonawanda St., Buffalo, N. Y.  
 Federal Machine & Welder Co., 2120 Dana St., Warren, O.  
 Fee and Stenwedel, Inc., 4949 N. Pulaski Rd., Chicago, Ill.  
 Felt Products Mfg. Co., 1523 Carroll Ave., Chicago, Ill.  
 Felters Co., Inc., 210 South St., Boston, Mass.  
 Field Mfg. Co., 2328 Nelson St., Chicago, Ill.  
 Figge Co., 189 W. Madison St., Chicago, Ill.  
 Fingels, Inc., W. A., Reistertown Road at Elgin Ave., Baltimore, Md.  
 Finnell Rotary Stokers, Inc., 502 East St., Elkhart, Ind.  
 Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago, Ill.  
 Firestone Tire & Rubber Co., 1400 S. Main St., Akron, O.  
 Fisher Governor Co., 102-07 S. First Ave., Marshalltown, Ia.  
 •Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City.  
 Flemm Lead Co., Inc., Bradley Ave., Long Island City, N. Y.  
 Flintkote Co., 50 W. 50th St., New York City.  
 Floral City Co., 402 S. Monroe St., Monroe, Mich.  
 Floyd-Weils Co., Royersford, Pa.  
 Fluid Heat Division Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore.  
 Flynn & Emrich Co., 301 Holliday St., Baltimore, Md.  
 Follansbee Brothers Co., 3rd & Liberty Aves., Pittsburgh, Pa.  
 Folsom Snow Guard Co., 80 Boylston St., Boston, Mass.  
 Foote Foundry Co., J. B., N. Main St., Fredericktown, O.  
 Foret-Air Co., 840 Cedar St., Rockford, Ill.  
 Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.  
 Fowler-Pem Co., 5317 Horton St., Emeryville, Cal.  
 Fox Engineering Co., 36 Portland St., Boston, Mass.  
 •Fox Furnace Division of American Radiator Co., Elyria, O.  
 Foxboro Co., Neponset Ave., Foxboro, Mass.  
 Franklin Gas Heating Co., 1232 Vine St., Cincinnati, O.  
 Fraser Furnace Co., Inc., 445 S. San Joaquin St., Stockton, Cal.  
 Frederick Iron & Steel Co., E. 7th & East Sts., Frederick, Md.  
 Freed Products Co., Moline, Ill.  
 Fresh'nd-Aire Co., 430 W. Erie St., Chicago, Ill.  
 Frick Co., Waynesboro, Pa.  
 Friedley-Voshart Co., 763 W. Lexington St., Chicago.  
 Friedrich & Dimmock, 7 E. 42nd St., New York City.  
 •Friez & Sons, Julien P., 4 N. Central Ave., Baltimore.  
 Fuel Savers Inc., 15th & Herr Sts., Harrisburg, Pa.  
 Fuller-Warren Co., 2506 N. 32nd St., Milwaukee, Wis.  
 Fulton Sylphon Co., Knoxville, Tenn.  
 •Furblo Co., Hermansville, Mich.  
 Furnaceslave, Inc., 1080 E. 52nd St., Indianapolis, Ind.

## G

•G. & O. Mfg. Co., 138 Winchester Ave., New Haven, Conn.  
 G. & S. Tool Co., 8790 Grinnell, Detroit, Mich.  
 G. D. S. Machinery & Supply Co., 101 Walker St., New York City.  
 Galva Heater Co., Galva, Ill.  
 Gammeter Co., W. F., Lincoln Ave. Extension, Cadiz, O.  
 Garber Lumber & Construction Co., Strasburg, O.  
 Garden City Fan Co., 332 S. Michigan Blvd., Chicago, Ill.  
 Gardiner Metal Co., 2504 W. 48th Pl., Chicago, Ill.  
 Gardner Manufacturing Co., Horicon, Wis.  
 Gas City Glass Co., Gas City, Ind.  
 Gasconaire, Inc., 3255 Goldner Ave., Detroit.  
 Gasoroll Co., Genoa City, Wis.  
 Gasweld Equipment Co., 625 W. Jackson Blvd., Chicago, Ill.  
 Gates Rubber Co., 999 S. Broadway, Denver, Colo.  
 Gehl Bros. Mfg. Co., West Bend, Wis.  
 Gehrl Co., 1117 Tacoma Ave., Tacoma, Wash.  
 General Blower Co., 2402 Market St., Philadelphia, Pa.  
 General Controls Co., 700 W. Ivy St., Glendale, Cal.  
 General Electric Co., 1 River Rd., Schenectady, N. Y.  
 General Equipment Co., 311-15-19 S. Wichita St., Wichita, Kan.  
 General Insulating & Mfg. Co., 705 Olive St., St. Louis.  
 General Metal Products Co., 3883 Delor St., St. Louis, Mo.  
 General Machine Co., Inc., 816-826 E. 140th St., New York City.  
 General Machinery Co., 3500 Riverside Ave., Spokane, Wash.  
 General Oil Heating Corp., 528 Jefferson St., West New York, N. J.  
 General Plate Co., Attleboro, Mass.  
 General Refrigeration Corporation, Shirland Ave., Beloit, Wis.  
 General Regulator Corp., 2608 Arthington St., Chicago, Ill.  
 General Sheet Metal Works, Inc., 120 Silliman Ave., Bridgeport, Conn.  
 General Stokers, Inc., Broad St. Station Bldg., Philadelphia.  
 Gerard Chemical Co., 87 Front St., Elizabeth, N. J.  
 Gerhardt, W. F., 2007 W. Broad St., Richmond, Va.  
 Germer Stove Co., Erie, Pa.  
 Gerstein & Cooper, South Boston, Mass.  
 Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.  
 Giant Grip Mfg. Co., 31 Osceola St., Oshkosh, Wis.  
 Giant Mfg. Company, South Ave., Council Bluffs, Ia.  
 Gilbert & Barker Mfg. Co., Springfield, Mass.  
 Gillian Mfg. Co., 650 E. Troy St., Ferndale, Mich.

Gilmer Co., L. H., Cottman & Keystone Sts., Tacony, Philadelphia, Pa.  
 Glasby Manufacturing Co., Inc., J. P., 144 Watsessing Ave., Bloomfield, N. J.  
 Glascock Bros. Mfg. Co., Muncie, Ind.  
 •Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.  
 Glidden Co., 11001 Madison Ave., Cleveland, O.  
 Globe Iron Roofing & Corrugating Co., P. O. Box 734, Cincinnati, O.  
 Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.  
 Globe Machinery & Supply Co., 205-211 W. Court Ave., Des Moines, Ia.  
 Globe Ventilator Co., 205 River St., Troy, N. Y.  
 G. M. Mfg. Co., Box 151, Madison Square Station, New York City.  
 Goese Mfg. Co., 2548 N. 18th St., Milwaukee, Wis.  
 Goethel Co., Alfred C., 2337 N. 31st St., Milwaukee, Wis.  
 Goethel Sheet Metal Works, Alfred, 1912 N. Killian Pl., Milwaukee, Wis.  
 Goldens' Foundry & Machine Co., Columbus, Ga.  
 Gold Seal Furnace Co., 234 S. Fourth St., Minneapolis, Minn.  
 Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Yonkers, N. Y.  
 Goodrich Co., B. F., 500 S. Main St., Akron, O.  
 Goodyear Tire & Rubber Co., E. Market St., Akron, O.  
 Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.  
 Graff Furnace Co., Scranton, Pa. (See Faultless Heater Corp., Cleveland, O.)  
 Grammes & Sons, Inc., 338 Union St., Allentown, Pa.  
 Grand Rapids Blow Pipe and Dust Arrester Co., 525 Monroe Ave., Grand Rapids, Mich.  
 Grand Rapids Die & Tool Co., 113-117 Michigan St., Grand Rapids, Mich.  
 Grand Rapids Wire Products Co., 503 Front Ave., N. W., Grand Rapids, Mich.  
 Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.  
 •Gray, G. L., New Haven, Conn.  
 Gray Metal Products, Inc., 30 Carlton St., Rochester, N. Y.  
 Green Foundry & Furnace Works, Third & Elm Sts., Des Moines, Ia.  
 Greene, Tweed & Co., 109 Duane St., New York City.  
 Grinnell Co., Inc., 260 W. Exchange St., Providence, R. I.  
 Grinnell Washing Machine Corp., 723-35 Main St., Grinnell, Ia.  
 Griswold Mfg. Co., 1001-1065 W. 12th St., Erie, Pa.  
 Grob Brothers, Grafton, Wis.  
 Grobet File Corp. of America, 3 Park Place, New York City.  
 Grossenbacher Steel Furnace & Mfg. Co., 2626 Woodson Rd., St. Louis.  
 Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago, Ill.  
 Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.

## H

Hague & Co., Inc., Alfred, 227 34th St., Brooklyn, N. Y.  
 Halelectric Laboratories, 1793 Lakeview Rd., Cleveland, O.  
 Hall Metal Products Co., 1285 Wilmington Blvd., Long Beach, Cal.  
 Hall-Neal Furnace Co., 1324 N. Capitol Ave., Indianapolis, Ind.  
 Hallstead Iron Foundry, Hallstead, Pa.  
 Hamilton Automatic Stoker Corp., 1637 Dixie Highway, Hamilton, O.  
 Hammett Mfg. Co., 1907 Holmes St., Kansas City, Mo.  
 Hampton Elec. Tool Co., 700 Walnut St., Edgewood, Pittsburgh, Pa.  
 Hampden Cornice Works, 218 St. James Blvd., Springfield, Mass.  
 Handelan Washed Air Co., 305 Fifth St., S., Minneapolis, Minn.  
 Handy & Harmon, 82 Fulton St., New York City.  
 Hardinge Oil Burner Co., 1770 Berteau St. at Ravenswood, Chicago, Ill.  
 Hardy Mfg. Co., 126 Davis Ave., Dayton, O.  
 Hare Stoker Corp., 4853 Rivard St., Detroit, Mich.  
 Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.  
 Harold Furnace Mfg. Co., 3310 Sprague Ave., Spokane, Wash.  
 •Harrington & King Perforating Co., 5649 Fillmore St., Chicago, Ill.  
 Harris Calorific Co., 5501 Cass Ave., N. W., Cleveland, O.  
 Harsch Co., Inc., H., 230 Tuscan Rd., Maplewood N. J.  
 •Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill.  
 Hart & Crouse Co., Inc., 301 Turner St., Utica, N. Y.  
 Hart Mfg. Co., Bartholomew & Hamilton Sts., Hartford, Conn.  
 Hart Mfg. Co., 2008 N. Western Parkway, Louisville, Ky.  
 Hart Oil Burner Corp., 2200 N. Adams St., Peoria, Ill.  
 Hartzell Propeller Fan Co., 1025 Roosevelt Ave., Piqua, O.  
 Harvey-Whipple, Inc., 55 Emery St., Springfield, Mass.  
 Hassall, Inc., John, Clay & Oakland Sts., Brooklyn, N. Y.  
 Hastings Air Conditioning Company, Inc., Box 481, 615 West South St., Hastings, Nebr.  
 Hauserman Co., E. F., 6800 Grant Ave., Cleveland.  
 Haynes Furnace Fan Co., 614 Prospect St., Kansas City, Mo.

● Advertisement in this issue. See Index to Advertisers, page 168.

Hays Corp., E. Eighth St., Michigan City, Ind.  
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.  
H-B Instrument Co., Inc., 2518 N. Broad St., Philadelphia, Pa.  
Health-O-Mist Humidifier Mfg. Co., James St., Columbus, Wis.  
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.  
Heath & Milligan Mfg. Co., Div. of The Glidden Co., 1833 S. Normal Ave., Chicago, Ill.  
Heating Assurance, Inc., 124 E. Augusta, Spokane, Wash.  
Heckler Bros., 965 Liberty Ave., Pittsburgh, Pa.  
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.  
Hell Co., 3000 W. Montana St., Milwaukee, Wis.  
Hemp Engineering & Stoker Corp., Macomb, Ill.  
Hendley & Whittemore Co., 6 Blackhawk Blvd., Beloit, Wis.  
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.  
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.  
● Henry Furnace & Foundry Co., 3473 E. 49th St., Cleveland, O.  
Her-Born Eng. & Mfg. Co., Box 666, Sandusky, O.  
Hercules Chemical Co., Inc., 332 Canal St., New York City.  
Heritage Stoker Sales, Inc., 105 E. 63rd St., Chicago, Ill.  
Herrmann & Grace Co., 671 Bergen St., Brooklyn, N. Y.  
Herron-Zimmers Moulding Co., 3654 Beaufort, Detroit, Mich.  
● Hess-Snyder Co., Massillon, O.  
● Hess Warming & Ventilating Co., 1211 S. Western Ave., Chicago, Ill.  
Hetzl Roofing Products Co., 67 Main St., Newark, N. J.  
Higgin Mfg. Co., Newport, Ky.  
Hill Co., E. Vernon, 179 W. Washington St., Chicago, Ill.  
Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.  
Hinde & Dauch Paper Co., Sandusky, O.  
Hipoint Corp., Water, Elm & Arnold Sts., Bellefontaine, O.  
Hirschman Co., Inc., W. F., 220 Delaware Ave., Buffalo, N. Y.  
Hobart Brothers Co., Canal Lock Square, Troy, O.  
Hoersting & Holtmann Co., 420 N. Main St., Dayton, O.  
Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Ind.  
Holley Heating & Mfg. Co., 21 S. Chester St., Pasadena, Cal.  
Hollup Corp., 3357 W. 47th Pl., Chicago, Ill.  
Holtum Mfg. Co., Freeport, Ill.  
Holtzer-Cabot Electric Co., 125 Amory St., Boston, Mass.  
Home Comfort Co., 182 E. 154th St., Harvey, Ill.  
Home Furnace Co., 6th St. & P. M. R. R., Holland, Mich.  
Home Oil Burner Corp., 236 Main St., Hempstead, N. Y.  
Home Stove Co., 501 Kentucky Ave., Indianapolis, Ind.  
Hones, Inc., Charles A., 122 S. Grand Ave., Baldwin, N. Y.  
Hood Co., E. Mifflin, Daisy, Tenn.  
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.  
Horton Mfg. Co., 3008 University Ave., S. E., Minneapolis, Minn.  
Hotentot Co., Inc., 1708 Howard St., Omaha, Nebr.  
Hotstream Heater Co., 8007 Grand Ave., Cleveland, O.  
Hough Co., Janesville, Wis.  
Howe & Bassett Co., Inc., 840 University Ave., Rochester, N. Y.  
Howell Electric Motors Co., Howell, Mich.  
Howell Mfg. Co., 1625 Cleveland Ave., Kansas City, Mo.  
Howes Co., S. M., 511 Medford St., Charlestown District, Boston, Mass.  
Hubbard Co., 1014 Marquette Ave., Minneapolis, Minn.  
Hub Specialty Co., 84 Governor Winthrop Rd., Somerville, Mass.  
Hudson Equipment Corp., 324 Third Ave., N., Minneapolis, Minn.  
Hudson-Root Company, P. O. Box 124, Brocton, N. Y.  
Hugo Mfg. Co., 49th Ave. W. & Superior St., West Duluth, Minn.  
Hunt & Son, C. B., Box 300, Salem, Ohio.  
Hupp Oil Burner Co., Inc., 251 Prospect Ave., Brooklyn, N. Y.  
● Hussey & Co., C. G., 2850 Second Ave., Pittsburgh, Pa.

Ideal Commutator Dresser Co., 1084 Park Ave., Sycamore, Ill.  
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.  
Ideal Furnace Co., 2995 E. Grand Blvd., Detroit, Mich.  
Ideal Metal Weather Strip Co., 1015 Walnut, Box 461, Boulder, Colo.  
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.  
Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, Ill.  
● Illinois Testing Laboratories, Inc., 412 N. LaSalle St., Chicago, Ill.  
Illinois Zinc Co., Peru, Ill.  
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.  
Imperial Electric Co., Ira Ave., Akron, O.  
Independence Stove & Furnace Co., Cor. Hayward & Cottage, Independence, Mo.  
Independent Air Filter Co., Inc., 228 N. LaSalle St., Chicago, Ill.  
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.  
● Independent Register Co., 3741 E. 93rd St., Cleveland, O.  
Indian Trailer Corporation, Koolroom Div., 2338 Indiana Ave., Chicago.

Industrial Air Conditioning Co., Inc., 3041 Aldrich Ave., So. Minneapolis, Minn.  
Industrial Engineering Co., Evansville, Ind.  
Industrial Sheet Metal Works, Inc., 628 E. Forest Ave., Detroit.  
Ingels Elbow Machine Corp., 2634 Fullerton Ave., Chicago.  
Ingersoll-Rand, 11 Broadway, New York City.  
Ingersoll Steel & Disc Div. Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.  
Ingle Mfg. Co., Atlantic & Grape Sts., San Diego, Cal.  
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
Insto-Gas Corporation, 1900 E. Jefferson, Detroit.  
Insulite Co., 1100 Builders Exchange Bldg., Minneapolis, Minn.  
Inter-Coastal Paint Co., 15th & Southern R. R., East St. Louis, Ill.  
International Engineering, Inc., 1145 Bolander, Dayton, O.  
International Heater Co., 101 Park Ave., Utica, N. Y.  
● International Nickel Co., Inc., 67 Wall St., New York City.  
International Steel Co., Edge St., Evansville, Ind.  
● Interstate Machinery Co., Inc., 130 S. Clinton St., Chicago, Ill.  
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia, Pa.  
Iowa Foundry Co., W. 2nd & Cook, Sioux City, Ia.  
Iowa Paint Mfg. Co., 118-20 Elgth St., Des Moines, Ia.  
Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland, O.  
Iwan Brothers, 1503 Prairie Ave., South Bend, Ind.

## J

Jackson-Bangor Slate Co., Pen Argyl, Pa.  
Jackson Sheet Metal Works, 3012 Washington Ave., Ogden, Utah.  
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw, Mich.  
Jacobs Co., B. & J., 1725 Johns St., Cincinnati, O.  
Jacobsen Mfg. Co., Washington at 8th, Racine, Wis.  
Jacobson Machine Works, Inc., A. E., 1090 Tenth Ave., S. E., Minneapolis, Minn.  
Jaden Mfg. Co., Inc., F., 1601 2nd St., Hastings, Nebr.  
Jamar Co., Walker, 367 S. First Ave., E., Duluth, Minn.  
James Regulator Co., Inc., Peacock St., Pottsville, Pa.  
Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.  
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.  
Jelliff Mfg. Corp., C. O., Southport, Conn.  
Jessop Steel Co., Washington, Pa.  
Jewett Stove & Foundry Corp., Military Rd., Buffalo, N. Y.  
Johns-Manville, 22 E. 40th St., New York City.  
Johnson Bronze Co., S. Mill St., New Castle, Pa.  
● Johnson Co., S. T., 940 Arlington St., Oakland, Cal., and 401 N. Broad St., Philadelphia, Pa.  
Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago, Ill.  
● Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.  
Johnson, Inc., William, Brenner & Kent Sts., Newark, N. J.  
Johnson Mfg. Co., Tenth & Sycamore, Waterloo, Ia.  
Johnson Mfg. Co., Urbana, O.  
Johnson Metal Products Co., Erie, Pa.  
Johnson Motors, Galesburg, Ill.  
Johnson Service Co., 507 E. Michigan St., Milwaukee, Wis.  
Johnson Tool Co., Inc., 65 Massasoit Ave., East Providence, R. I.  
Johnston & Chapman Co., 2925 Carroll Ave., Chicago, Ill.  
Johnston & Jennings Co., 877 Addison Rd., Cleveland, O.  
Johnston Co., Wm. W., 115 Bayard St., Dayton, O.  
Johnston Gas Furnace Corp., 11847 Vose St., North Hollywood, Cal.  
Johnston Mfg. Co., 2825 E. Hennepin Ave., Minneapolis, Minn.  
Johnston Tin Foil & Metal Co., 6100 S. Broadway, St. Louis, Mo.  
Joliet Heating Corp., 2101 Herkimer St., Joliet, Ill.  
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh, Pa.  
Jones Foundry & Machine Co., W. A., 4401 W. Roosevelt Rd., Chicago, Ill.  
Jordan & Co., Paul R., 630 S. Delaware St., Indianapolis, Ind.

## K

Kals Sunrise Works, 5659 Linwood Ave., Detroit, Mich.  
Kaiseraire Products Sales Co., 3336 Franklin Blvd., Chicago, Ill.  
Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.  
Kane Mfg. Corporation, Kane, Pa.  
Kansas City Furnace Co., 624 Prospect, Kansas City, Mo.  
Kauffman Air Conditioning Corp., 4336 W. Pine St., St. Louis, Mo.  
Kaybar Burner Corp., 4545 Cottage Grove Ave., Chicago, Ill.  
● K-B-Damper Control, 2803 Jefferson Ave., Cincinnati, O.  
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.  
Keith Furnace Co., Dean Ave. at E. 26th, Des Moines, Ia.  
Keldur Corp., 420 Lexington Ave., New York City.  
Kellogg Compressor & Mfg. Corp., 97 Humboldt St., Rochester, N. Y.  
Kel-San Manufacturing Co., Dayton, Ohio.

● Advertisement in this issue. See Index to Advertisers, page 168.



Kelsey Heating Co., Inc., 277 James St., Syracuse, N. Y.  
 Kelvinator Division, Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit.  
 Kelvin-White Co., 90 State St., Boston.  
 Kent Co., Inc., 103 Canal St., Rome, N. Y.  
 Kernchen Co., 103 E. Wacker Dr., Chicago, Ill.  
 Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill.  
 Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.  
 Kimberly-Clark Corp., 8 S. Michigan Ave., Chicago.  
 King Metal Co., 601 North Indiana, Oklahoma City, Okla.  
 King Ventilating Co., Box 178, Owatonna, Minn.  
 Kinnear Mfg. Co., P. O. Box 598, Columbus, O.  
 Kirk & Blum Mfg. Co., 2850 Spring Grove Ave., Cincinnati, O.  
 Kisco Co., Inc., 39th & Chouteau Ave., St. Louis.  
 Kitson Co., Westmoreland & Stokley Sts., Philadelphia, Pa.  
 Klauer Mfg. Co., 9th & Washington Sts., Dubuque, Ia.  
 Klee Co., Geo. B., 635 Rockdale Ave., Cincinnati, O.  
 Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.  
 Kleen-Heat, Inc., 1823 Carroll Ave., Chicago, Ill.  
 Klein Stove Co., Trenton Ave. & Tloga St., Philadelphia, Pa.  
 Knowles Mushroom Ventilator Co., 41 N. Moore St., New York City.  
 •Kol-Master Corp., Oregon, Ill.  
 Kool-Klean Company, Newton, Iowa.  
 Koons Furnace Co., 219 W. Van Buren, Danville, Ill.  
 Koppers Co., Koppers Bldg., Pittsburgh, Pa.  
 Korfund Co., Inc., 48-15 32nd Pl., Long Island City, N. Y.  
 Korth Oil Burner Corp., 123 Hawthorne St., Roselle Park, N. J.  
 Kraker, Henry, 54 W. 14th St., Holland, Mich.  
 Krehbiel, J. H., 425 N. Crawford Ave., Chicago, Ill.  
 Kruse Co., Inc., 353 W. 16th Pl., Indianapolis, Ind.  
 Kruse & Dewenter Co., 427-429 E. Washington St., Indianapolis, Ind.

## L

Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis, Mo.  
 Laclede Steel Co., Arcade Bldg., St. Louis, Mo.  
 Laco Oil Burner Co., 238 Union St., Griswold, Ia.  
 La Crosse Steel Roofing & Corrugating Co., 300 S. Third St., La Crosse, Wis.  
 Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.  
 •Lamneck Products, Inc., 414 Dublin Ave., Columbus, O.  
 Landwehr Heating Corp., 6th & Cayuga Sts., Philadelphia, Pa.  
 Langsenkamp Co., F. H., 229 E. South St., Indianapolis, Ind.  
 Lastik Products Co., Inc., 603 American Bank Bldg., Pittsburgh, Pa.  
 •Lau Blower Co., 954-72 E. Monument Ave., Dayton, O.  
 Leach Co., 412 S. Main St., Oshkosh, Wis.  
 Leahy Mfg. Co., 1804 E. 8th St., Los Angeles, Cal.  
 Lecourtenay Co., 5 Main St., Newark, N. J.  
 Ledkote Products Co., 35-01 Vernon Blvd., Long Island City, N. Y.  
 Lee & Son Co., K. O., Aberdeen, S. D.  
 Lee & Son Co., Thomas, 128-132 W. Second St., Cincinnati, O.  
 Lee Heating Systems, 810 Union National Bank Bldg., Youngstown, O.  
 Leeds & Northrup Co., 4953 Stenton Ave., Philadelphia, Pa.  
 Leeson Co., T. F., 14631 Meyers Rd., Detroit, Mich.  
 Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.  
 Leinweber Fan & Blower Co., 8448 Crandon Ave., Chicago.  
 Leland Electric Co., 1501 Webster St., Dayton, O.  
 Lennox Furnace Co., 200 Lincoln Highway, Marshalltown, Ia., and Syracuse, N. Y.  
 •Levow, David, 308 W. 20th St., New York City.  
 Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis, Mo.  
 Libbey-Owens-Ford Glass Co., Box 919, Toledo, O.  
 Liberty Machine Co., 324 N. Roosevelt St., Green Bay, Wis.  
 Liberty Coal Burner Co., 4363 Duncan St., St. Louis, Mo.  
 Liberty Foundry Co., Sidney & Ohio Sts., St. Louis, Mo.  
 Lincoln Electric Co., 12818 Colt Rd., Cleveland, O.  
 Linde Air Products Co., 30 E. 42nd St., New York City.  
 Link-Belt Co., Stoker Div., 2410 W. 18th St., Chicago, Ill.  
 Liquefied Gas Appliance Co., Mars, Pa.  
 Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.  
 Little Burner Co., Inc., H. C., 2nd & Lincoln, San Rafael, Cal.  
 Little Janitor Furnace Clock Co., 621 Broadway, N. Y. C.  
 Littleford Bros., 457 E. Pearl St., Cincinnati, O.  
 •Lochinvar Corp., 14247 Tireman Ave., Dearborn, Mich.  
 •Lockformer Co., 4409 W. Kinzie St., Chicago.  
 Logan-Long Co., 37 W. Van Buren St., Chicago, Ill.  
 Lohman, Inc., William J., 63 Ninth Ave., New York City.  
 Lookout Furnace Co., Manufacturer's Rd. & Compress St., Chattanooga, Tenn.  
 Lord Mfg. Co., 1641 W. 12th St., Erie, Pa.  
 Lovejoy Flexible Coupling Co., 5001 W. Lake St., Chicago, Ill.  
 "Loyal Knight" Mfg. Corp., 24th & W. Main St., Belleville, Ill.  
 Ludlow-Saylor Wire Co., Newstead Ave. & Wabash R. R., St. Louis, Mo.

Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago, Ill.  
 Lukens Metal Co., Thos. F., 1105 Fairmount Ave., Philadelphia, Pa.  
 Lukens Steel Co., 308 S. First Ave., Coatesville, Pa.  
 Lustrco Coated Sheets Co., 1220 Ridge Ave., Pittsburgh, Pa.  
 Lyman Co., H. B., Southampton, Mass.  
 Lynn Products Co., 7 Willow St., Lynn, Mass.  
 •Lyon, Conklin & Co., Inc., Race & McComas Sts., Baltimore, Md.

## M

Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.  
 McClave-Brooks Co., W. Poplar St., Scranton, Pa.  
 McClure Builders' Supply Co., 68 E. Clark St., East Palestine, O.  
 McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit, Mich.  
 McCorkle Co., D. H., Sixth & Bancroft Way, Berkeley, Cal.  
 McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.  
 McGee-Parry Machine Works, 465 W. 8th St., Salt Lake City, Utah.  
 McKay Co., 1005 Liberty Ave., Pittsburgh, Pa.  
 McPherson Furnace & Supply Co., 1805 N. E. 2nd Ave., Portland, Ore.  
 McQuay, Inc., 1600 Broadway, N. E., Minneapolis, Minn.  
 MaGirl Foundry & Furnace Works, P. H., 401-413 E. Oakland Ave., Bloomington, Ill.  
 Mahan Oil Burner & Furnace Co., Lake & Church, Elmhurst, Ill.  
 Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.  
 Mahoning Valley Steel Co., McKees Lane, Niles, O.  
 •Maid-O'-Mist, Inc., 180 N. Wacker Dr., Chicago, Ill.  
 Majestic Co., 733 Erie St., Huntington, Ind.  
 Majestic Furnace Co., 1723 Westlake Ave., N., Seattle, Wash.  
 Mall Tool Company, 7740 South Chicago Ave., Chicago, Ill.  
 •Malleable Iron Fittings Co., Branford, Conn.  
 Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City, N. Y.  
 Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.  
 Manley Products Corp., State & Hay Sts., York, Pa.  
 Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport, Conn.  
 Maple City Furnace Co., 605 S. Main St., Monmouth, Ill.  
 Maple Valley Mfg. Co., First St., Mapleton, Ia.  
 Maplewood Machinery Co., Inc., 2634 Fullerton Ave., and 561 W. Washington Blvd., Chicago.  
 Marathon Electric Mfg. Corp., Wausau, Wis.  
 Marblehead Lime Co., 160 N. LaSalle St., Chicago.  
 Marion Machine, Foundry & Supply Co., P. O. Box 685, Marion, Ind.  
 Marley Co., 3001 Fairfax Road, Kansas City, Kan.  
 Marlo Coll Co., 6135 Manchester Ave., St. Louis, Mo.  
 Marquette Mfg. Co., Inc., 401-409 Johnson St., N. E., Minneapolis, Minn.  
 Marsh Lumber Co., 535-611 Tuscarawas Ave., N. W., Dover, O.  
 Marshall Furnace Co., Marshall, Mich.  
 Marshall Heating Co., 1647 Hennepin Ave., Minneapolis, Minn.  
 Marshalltown Mfg. Co., 901 E. Nevada St., Marshalltown, Ia.  
 Martin, J. O., and C. U., 647 Minna St., San Francisco.  
 Martin Metal Mfg. Co., 900 E. 2nd St., Wichita, Kan.  
 Martin-Parry Corp., W. Market St., York, Pa.  
 Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia, Pa.  
 Marvelaire Corp., 1827 Pontius Ave., West Los Angeles, Calif.  
 Masonite Corp., 111 W. Washington St., Chicago, Ill.  
 Master Electric Co., 100 Davis Ave., Dayton, O.  
 Master Welders, 1429 Virginia St., Kansas City, Mo.  
 Matthiessen & Hegeler Zinc Co., LaSalle, Ill.  
 Maurath, Inc., 7309 Union Ave., Cleveland, O.  
 •Maurey Mfg. Corp., Wabash at 29th, Chicago, Ill.  
 May Oil Burner Corp., Maryland Ave. & Oliver St., Baltimore, Md.  
 May-Fieberger Co., S. 21st St., Newark, O.  
 Mayflower-Lewis Corp., Duluth Ave. & E. Seventh St., St. Paul, Minn.  
 Mayflower Oil Burner Corp., 5002 Hudson Blvd., West New York, N. J.  
 Maysteel Products, Inc., Horicon St., Maysville, Wis.  
 Maze Co., W. H., 1207 Water St., Peru, Ill.  
 Mechanical Air, 801 Thomas St., Little Rock, Ark.  
 Medart Co., 3500 DeKalb St., St. Louis, Mo.  
 Meler Electric & Machine Co., 3525 E. Washington St., Indianapolis, Ind.  
 Melbye Bros., Inc., 3204 N. Oakley Ave., Chicago, Ill.  
 Mellish & Murray Co., 1715 Carroll Ave., Chicago, Ill.  
 Merchant & Evans Co., 2035 Washington Ave., Philadelphia, Pa.  
 •Mercoid Corp., 4201 Belmont Ave., Chicago, Ill.  
 Mesker & Co., Geo. L., 400 N. W. First St., Evansville, Ind.  
 Metal Door & Trim Co., La Porte, Ind.  
 Metal & Thermit Corp., 120 Broadway, New York City.  
 Metalizing Co., 1351 E. 17th St., Los Angeles, Cal.  
 Metal Products Co., 1811 Linn St., Cincinnati, O.  
 Metalace Corp., 60 K St., South Boston, Mass.

•Advertisement in this issue. See Index to Advertisers, page 168.



Metals Coating Co. of America, 495 N. Third St., Philadelphia, Pa.  
 Metropolitan Refining Co., 23 50th Ave., Long Island City, N. Y.  
 Metzner Stove Repair Co., 515 Wyandotte, Kansas City, Mo.  
 ● Meyer & Bro. Co., F., 1311-13 S. Adams St., Peoria, Ill.  
 ● Meyer Furnace Co., 1300 S. Washington St., Peoria, Ill.  
 Meyer Mfg. Co., 4823 Wabash Ave., Detroit.  
 ● Michigan Tank & Furnace Corp., 14101 Prairie Ave., Detroit, Mich.  
 Micro Products Co., 20 N. Wacker Dr., Chicago.  
 Micro-Westco, Inc., Bettendorf, Ia.  
 Middleton Mfg. Co., H. C., 169 26th Ave., S. E., Minneapolis, Minn.  
 Midwest Aluminum Products, Inc., 123 E. Pittsburgh Ave., Milwaukee, Wis.  
 Midwest Ventilating Works, 123 E. Pittsburgh Ave., Milwaukee, Wis.  
 Milburn Co., Alexander, 1424 W. Baltimore St., Baltimore, Md.  
 ● Milcor Steel Co., 4117 W. Burnham St., Milwaukee, Wis.  
 Miller & Connell Co., 1454-56 N. Claremont Ave., Chicago, Ill.  
 Miller & Doing, Inc., 58 York St., Brooklyn, N. Y.  
 Miller & Son, C. Arthur, 202-204 S. Main St., Elmira, N. Y.  
 Miller Electric Mfg. Co., Inc., 905 N. Meade St., Appleton, Wis.  
 Miller Floor Furnace Co., 741 E. 14th St., Oakland, Cal.  
 Miller Range & Furnace Co., Wm., 810-812 Main St., Cincinnati, O.  
 Miller Rubber Co., Inc., 1247 S. High St., Akron, O.  
 Mill-Rose Co., 2498 E. 79th St., Cleveland, O.  
 Mills Novelty Co., 4110 W. Fullerton Ave., Chicago, Ill.  
 Milwaukee Brush Mfg. Co., 2236 N. 30th St., Milwaukee, Wis.  
 Mineral Felt Co., 2284-92 Albion St., Toledo, O.  
 Mineral Insulation Co., 103rd & S. West Highway, Chicago Ridge, Ill.  
 Minneapolis Automatic Draft Regulator Co., 506 Produce Exchange Bldg., Minneapolis, Minn.  
 ● Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave., S., Minneapolis, Minn.  
 Minn-Kota Foundry & Mfg. Co., 201 Second St., N., Fargo, N. D.  
 Minster Machine Co., Minster, O.  
 Misener Mfg. Co., Inc., 326 E. Washington St., Syracuse, N. Y.  
 Mitchell Moulding Co., 1501 Circle Ave., Forest Park, Ill.  
 Model Mfg. Co., 316 E. Main St., Richmond, Va.  
 Modern Engineering Co., 3411 Pine Blvd., St. Louis, Mo.  
 Modern Equipment Corp., Defiance, Ohio.  
 ● ModernAire Engineering Co., 107 S. W. Second Ave., Des Moines, Ia.  
 Modine Mfg. Co., 17th St., Racine, Wis.  
 Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill, N. Y.  
 Mohler Co., J. K., The, 151 Church Ave., Ephrata, Pa.  
 Mohr-Air Co., 422 Huber Bldg., Marion, O.  
 Moloch Foundry & Machine Co., Kaukauna, Wis.  
 Monarch Furnace Fittings Manufacturers, 2240 W. 49th St., Chicago, Ill.  
 Monarch Heating Co., 4661 Alger St., Los Angeles.  
 Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia, Pa.  
 Monarch Metal Weatherstrip Corp., 6333 Etzel Ave., St. Louis, Mo.  
 Moncrief Furnace Co., P. O. Box 1673, Atlanta, Ga.  
 Moncrief Furnace & Manufacturing Co., Inc., 3903 Main St., Dallas, Texas.  
 Monitor Controller Co., 51 S. Gay St., Baltimore, Md.  
 ● Monmouth Products Co., 1929-41 East 61st St., Cleveland, O.  
 Montag Stove & Furnace Works, 2011 N. Columbia Blvd., Portland, Ore.  
 Montgomery Brothers, 61 Fremont St., San Francisco, Cal.  
 Moore Corp., Benton St., Joliet, Ill.  
 Morris Machine Works, 31 E. Genesee St., Baldwinsville, N. Y.  
 Morse Chain Co., P. O. Box 568, Ithaca, N. Y.  
 Mortell Co., J. W., 310 S. Michigan Ave., Chicago, Ill.  
 Motorstoker Div., Hershey Machine & Foundry Co., Manheim, Pa.  
 Mountain States Equipment Co., 1238 Speer Blvd., Denver, Colo.  
 Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.  
 ● Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee, Wis.  
 Mullins Mfg. Corp., Warren, O.  
 Muncie Gear Works, Inc., N. Vine St., Muncie, Ind.  
 Mundet Cork Corp., 450 7th Ave., New York City.  
 Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City, N. J.  
 Murray Tile Co., Cloverport, Ky.  
 Myers & Bro. Co., The F. E., Ashland, O.  
 Myers Electric Co., 410 Third Ave., Pittsburgh, Pa.

## N

Nash Engineering Co., South Norwalk, Conn.  
 Nash Refrigeration Co., Inc., Summit, New & Bleecker Sts., Newark, N. J.

National Airoil Burner Co., 1327 Girard Ave., Philadelphia, Pa.  
 National Brass & Copper Co., Inc., 518 Grant Bldg., Lisbon, Ohio.  
 National Fireproofing Corp., 202 E. Ohio St., N. S., Pittsburgh, Pa.  
 National Foundry & Furnace Co., Station "B," Dayton, O.  
 National Gypsum Co., Delaware Ave., Buffalo, N. Y.  
 National Lead Co., 111 Broadway, New York City.  
 National Lock Co., Inc., Rockford, Ill.  
 National Machine Tool Co., 1536 Clark St., Racine, Wis.  
 National Machine Works 122 S. Michigan Ave., Chicago, Ill.  
 National Mfg. Corp., 160 Fillmore Ave., Tonawanda, N. Y.  
 National Manufacturing & Engineering Co., 628 E. Forest Ave., Detroit, Mich.  
 National Regulator Co., 2301 N. Knox Ave., Chicago, Ill.  
 National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, O.  
 National Sheet Metal Co., 1617-1629 Water St., Peru, Ill.  
 National Stainless Clip Corporation, 51 Chambers St., New York City.  
 National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.  
 National Super Service Co., 1944 N. 13th St., Toledo, O.  
 Naylor Corp., Air Cond. Div., 1230 E. 92nd St., Chicago, Ill.  
 Neemes Foundry, Inc., 286 First St., Troy, N. Y.  
 Nelson Co., 2604 4th Ave., Detroit, Mich.  
 Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.  
 Nelson Mfg. Co., B. F., Cor. Main & Marshall Sts., N. E., Minneapolis, Minn.  
 Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia, Pa.  
 New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.  
 New Delphos Mfg. Co., 102-124 S. Pierce St., Delphos, O.  
 New Departure Div. General Motors Corp., Bristol, Conn.  
 New Haven Copper Co., Seymour, Conn.  
 New Jersey Zinc Sales Co., 160 Front St., New York City.  
 Newman Brothers, Inc., 662-670 W. Fourth St., Cincinnati, O.  
 Newport Rolling Mill Co., The, 9th & Lowell Sts., Newport, Ky.  
 New York Blower Co., 3155 Shields Ave., Chicago, Ill.  
 Niagara Blower Co., 6 E. 45th St., New York City.  
 ● Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.  
 Niles Rolling Mill Co., Niles, O.  
 Norge Heating & Conditioning Div., Borg-Warner Corp., 670 E. Woodbridge St., Detroit, Mich.  
 Norma-Hoffman Bearings Corp., Stanford, Conn.  
 Norman Sheet Metal Mfg. Co., W. F., 212-236 N. Cedar St., Nevada, Mo.  
 Norristown Magnesite & Asbestos Co., Washington St., Below Ford St., Norristown, Pa.  
 North Bangor Slate Co., Bangor, Pa.  
 Northern Blower Co., 6409 Barborton Ave., Cleveland, O.  
 Northern Weatherstrip Co., 367 S. 1st Ave. E., Duluth, Minn.  
 ● Northwestern Stove Repair Co., 662 W. Roosevelt Rd., Chicago, Ill.  
 Nortmann-Duffke Co., 2740 S. 32nd St., Milwaukee, Wis.  
 Norwin Co., East Albion St., Freeport, Ill.  
 Novy Ventilator Mfg. Co., 207 E. Broadway, Muskogee, Okla.  
 Nugent Sons, Inc., Thos., 223 E. 80th St., New York City.  
 Nu-Way Corp., 2416 Fourth Ave., Rock Island, Ill.

## O

Oakland Foundry Co., Avenue A & L & N. Tracks, Belleville, Ill.  
 O'Brien Varnish Co., South Bend, Ind.  
 Odin Stove Mfg. Co., Erie, Pa.  
 Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, O.  
 Ohio Products Co., 16507 Lucille Ave., Cleveland, O.  
 Ohio Valley Pulley Works, Div. Browning Mfg. Co., Inc., Maysville, Ky.  
 Ohio Welder Co., Middlefield, O.  
 Ohio Wire Products Co., 219 W. Third St., Dover, O.  
 Ohl & Co., Geo. A., 151-161 Oraton St., Newark, N. J.  
 Ohmlac Paint & Refining Co., 6540 S. Central Ave., Chicago, Ill.  
 Orbon Stove Co., L. & N. and Sycamore St., Belleville, Ill.  
 "Original" Metal Flanging Machine Works, 952 20th Ave., Seattle, Wash.  
 Ormsby-Osterman Company, 6625 Delmar Blvd., St. Louis, Mo.  
 ● Osborn Co., J. M. & L. A., 1541 E. 38th St., Cleveland, O.  
 Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.  
 Otis Steel Co., 3341 Jennings Rd., Cleveland, O.  
 OverSpreed Stoker Co., Fulton, Jackson & Jefferson Sts., Ottawa, Ill.  
 Owens-Corning Fiberglas Corp., Second National Bank Bldg., Toledo, O.

## P

● Pacific Gas Radiator Co., 1740 W. Washington St., Los Angeles, Cal.  
 Pacific Lumber Co., 100 Bush St., San Francisco, Cal.  
 Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Cal.

● Advertisement in this issue. See Index to Advertisers, page 168.

Packham Crimper Co., Mechanicsburg, O.  
 Page Steel & Wire Div. of American Chain Co., Inc., Monessen, Pa.  
 Palmer Electric Co., 20 Sproat St., Detroit, Mich.  
 Pan American Engineering Company, 820 Parker St., Berkeley, Cal.  
 Par Appliances, Inc., Affiliated with LaCrosse Tractor Co., LaCrosse, Wis.  
 Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.  
 Paragon Oil Burner Corp., 75 Bridgewater St., Brooklyn, N. Y.  
 Park City Cornice Works, Inc., 56 McKinley Ave., Bridgeport, Conn.  
 • Parker-Kalon Corp., 190 Varick St., New York City.  
 Parkersburg Iron & Steel Co., Parkersburg, W. Va.  
 Parks-Cramer Co., 970 Main St., Fitchburg, Mass.  
 Patent Novelty Co., 312 Eighth St., Fulton, Ill.  
 Patten Co., J. V., 500 DeKalb Ave., Sycamore, Ill.  
 Patterson Foundry & Machine Co., East Liverpool, O.  
 Patterson Shade Co., 1525 N. Meridian St., Indianapolis, Ind.  
 Payne Furnace & Supply Co., 338 N. Foothill Rd., Beverly Hills, Cal.  
 Peacard Co., M. A., 195 Dudley St., Boston.  
 Peck, Stow & Wilcox Co., Center St., Southington, Conn.  
 Pecora Paint Co., 4th St. & Erie Ave., Philadelphia, Pa.  
 • Peerless Electric Co., 2000 W. Market St., Warren, O.  
 • Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis, Ind.  
 • Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville, Ky.  
 Peerless of America, Inc., 515 W. 35th St., Chicago, Ill.  
 Peerless Oil Burner Co., Inc., 3926 Main St., Kansas City, Mo.  
 Pels & Co., Inc., Henry, 90 West St., New York City.  
 Pencilsharp Awl & Tool Co., 1423-25 E. Illinois St., Evansville, Ind.  
 • Peninsular Stove Co., 2699 Gratiot Ave., Detroit, Mich.  
 Penn Electric Switch Co., Box 556, Goshen, Ind.  
 Penn Ventilating Co., 2812 Richmond St., Philadelphia, Pa.  
 Pennsylvania Engineering Works, 526 S. Jefferson St., New Castle, Pa.  
 Pennsylvania Furnace & Iron Co., Pine St., Warren, Pa.  
 Pentecost & Craft Co., 429 Wabash Ave., Terre Haute, Ind.  
 Peoples Oil Burner Co., 400 W. Madison St., Chicago, Ill.  
 Perfectaire Corp., 1102 N. Charles St., Baltimore, Md.  
 Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield, Mass.  
 Perfection Stove Co., 7609 Platt Ave., Cleveland, O.  
 Perfex Corp., 415 W. Oklahoma Pl., Milwaukee, Wis.  
 Perkins Machine Co., 4 Perkins Ave., Warren, Mass.  
 Perkinson & Brown, 412 N. Wolcott Ave., Chicago.  
 Pernot & Rich, Inc., 2546 San Fernando Rd., Los Angeles.  
 Perrin Co., Edward C., 3rd & Grant Sts., Camden, N. J.  
 Peterson Freezem Mfg. & Sales Co., Kansas City, Mo.  
 Petroleum Heat & Power Co., Stamford, Conn.  
 Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.  
 Pfeiffer, Wm., 416 Greenwich St., New York City.  
 Philco Radio & Television Corp., 3710 N. Broad St., Philadelphia.  
 Piatt Products Corp., 1149 S. Pennsylvania Ave., Lansing, Mich.  
 Pierce & Stevens, Inc., 710 Ohio St., Buffalo, N. Y.  
 • Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich.  
 Pilley Packing and Flue Brush Mfg. Co., 606 S. 3rd St., St. Louis, Mo.  
 Pioneer Air Conditioning Corp., 1300 Stevens Ave., Minneapolis, Minn.  
 Pioneer Heat Regulator Division, Master Electric Co., 100 Davis Ave., Dayton, Ohio.  
 Pioneer Manufacturing Co., 714 Oakland N. E., Cedar Rapids, Ia.  
 Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh, Pa.  
 Pittsburgh Furnace Parts Co., 109 Federal St., Pittsburgh, Pa.  
 Pittston Stove Co., P. O. Box 29, Pittston, Pa.  
 Plastergon Wall Board Co., Philadelphia Ave., Buffalo, N. Y.  
 Plastic Products Co., 6475 Georgia Ave., Detroit, Mich.  
 Pilbrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago, Ill.  
 Plymouth Cordage Co., Court St., North Plymouth, Mass. (Anderson Products, Inc., Cambridge, Mass. National Sales Agents.)  
 Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.  
 Poe, Ralph W., 44 White Ct., Canton, Ill.  
 Polk Mfg. Co., 2021-23 Winnebago St., Madison, Wis.  
 Pomona Pump Co., 206 E. Commercial St., Pomona, Cal.  
 Portland Stove Fdry. Co., Portland, Me.  
 Potomac Mfg. Co., 316 S. 10th St., Philadelphia, Pa.  
 Power King Tool Corp., 310 E. Market St., Warsaw, Ind.  
 Powers Regulator Co., 2720 Greenville Ave., Chicago, Ill.  
 • Practical Instrument Co., 2713 N. Ashland Ave., Chicago, Ill.  
 Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia, Pa.  
 Preferred Utilities Manufacturing Corp., 33 W. 60th St., New York City.  
 • Premier Furnace Co., Box 150, Dowagiac, Mich.  
 Prestite Engineering Co., 3900 Chouteau St., St. Louis, Mo.  
 Pressure Oil Burners, Inc., 55 N. Broad St., York, Pa.

Propellair, Inc., 1345 Lagonda Ave., Springfield, O.  
 Providence Cornice Co., 309 Canal St., Providence, R. I.  
 Pryne & Co., Inc., 1245 E. 33rd St., Los Angeles, Cal.  
 Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis, Mo.  
 Pulvokol, Inc., 406 S. Second Ave., Minneapolis, Minn.  
 Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill.  
 Pyramid Metals Co., 1334 N. Wells St., Chicago.  
 • Pyrolite Products Co., 1221-31 W. 74th St., Cleveland, O.

## Q

Quaker Mfg. Co., 223 W. Erie St., Chicago, Ill.  
 Quickwork Co., 400 W. Madison St., Chicago.  
 Quile\* Heet Burner Co., 1555 Coney Island Ave., Brooklyn, N. Y.  
 Quiet Heat Mfg. Co., 121 N. J. Railroad Ave., Newark, N. J.  
 Quimby Pump Co., Inc., 340 Thomas St., Newark, N. J.

## R

R-S Products Corp., 4530 Germantown Ave., Philadelphia, Pa.  
 Racine Sheet Metal Works, Olive & Lathrop Sts., Racine, Wis.  
 Racine Stoker Mfg. Co., 1014 Eighth St., Racine, Wis.  
 Rafter Machine Co., 259 Stephen St., Belleville, N. J.  
 Ramey Mfg. Co., 243 N. 5th St., Columbus, O.  
 Ramtite Co., Division of S. Obermayer Co., 2563 W. 18th St., Chicago, Ill.  
 Ranco, Inc., 601 W. Fifth Ave., Columbus, Ohio.  
 • Randall Graphite Products Corp., 609 W. Lake St., Chicago, Ill.  
 Ravenna Furnace & Heating Co., Ravenna, O.  
 Rawlplug Co., Inc., The, 98 Lafayette St., New York City.  
 Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco, Cal.  
 Red Jacket Mfg. Co., Davenport, Ia.  
 Reed Unit-Fans, Inc., 811 St. Charles St., New Orleans, La.  
 Reeves Steel & Mfg. Co., Dover, O.  
 Refractory & Insulation Corp., 381 Fourth Ave., New York City.  
 Refrigeration Appliances, Inc., 923 W. Lake St., Chicago, Ill.  
 Refrigeration Economics Co., Inc., 1232 Second St., N. E., Canton, Ohio.  
 Rega Mfg. Co., 79 Mt. Hope Ave., Rochester, N. Y.  
 • Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn, N. Y.  
 Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo, O.  
 Reif-Rexoil, Inc., 87 Carroll St., Buffalo, N. Y.  
 Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis, Ind.  
 Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.  
 Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, O.  
 Reliance Refrigeration Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.  
 Rempe Co., 340 N. Sacramento Ave., Chicago, Ill.  
 • Republic Steel Corp., Republic Bldg., Cleveland, O.  
 Research Corp., 405 Lexington Ave., New York City.  
 • Research Products Corporation, 1011 E. Washington Ave., Madison, Wis.  
 Revere Copper and Brass Incorporated, 230 Park Ave., New York City.  
 Reynolds Manufacturing Co., 412 Prospect N. E., Grand Rapids, Mich.  
 Rex Clay Products Company, 14414 Dexter Blvd., Detroit, Mich.  
 Reznor Mfg. Co., Mercer, Pa.  
 Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.  
 Ribside Furnace Co., 119½ Clinton St., Wausau, Wis.  
 Richards-Wilcox Mfg. Co., Third St., Aurora, Ill.  
 Richardson & Boynton Co., 244 Madison Ave., New York City.  
 Richmond Fireproof Door Co., Richmond, Ind.  
 Risdon Stoker Corp., 6355 Rainier Ave., Seattle, Wash.  
 Rising & Nelson Slate Co., West Pawlet, Vt.  
 Rival Strap Corporation, 308 W. 20th St., New York City.  
 Roan Mfg. Co., 1220 Washington Ave., Racine, Wis.  
 Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.  
 Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo, N. Y.  
 Roberts-Hamilton Co., 707-715 S. Third St., Minneapolis, Minn.  
 Roberts Tube Works, 2500 Military Ave., Detroit.  
 Robertson Co., H. H., 2000 Grant Bldg., Pittsburgh, Pa.  
 Robinson Furnace Co., 213 W. Hubbard St., Chicago.  
 Rochester Lead Works, Inc., 380 Exchange St., Rochester, N. Y.  
 • Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.  
 Rock Island Stove Co., 200 Fourth St., Rock Island, Ill.  
 Rock River Machine Co., Inc., N. Main St., Janesville, Wis.  
 Rockwood Mfg. Co., 1801 English Ave., Indianapolis, Ind.  
 Rock Wool Products Co., Inc., P. O. Box 276, Wabash, Ind.  
 Roebbing's Sons Co., John A., 640 S. Broad St., Trenton, N. J.  
 Rome-Turney Radiator Co., Canal St., Rome, N. Y.  
 Root-Connersville Blower Corp., Connersville, Ind.  
 Roper Corp., Geo. D., Blackhawk Ave., Rockford, Ill.

• Advertisement in this issue. See Index to Advertisers, page 168.



Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.  
 Rosedale Foundry & Machine Co., Columbus Ave., N. S., Pittsburgh, Pa.  
 Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Cal.  
 ●Round Oak Co., Dowagiac, Mich.  
 Roxalln Flexible Lacquer Co., Inc., 800 Magnolia Ave., Elizabeth, N. J.  
 Royal Air Conditioning Equipment, 1900 Alameda Blvd., Compton, Cal.  
 Royal-Apex Mfg. Corp., 62 Schenectady Ave., Brooklyn, N. Y.  
 Royal Ventilator Co., 415 Locust St., Philadelphia, Pa.  
 Royersford Foundry & Machine Co., Royersford, Pa.  
 ●Ruberoid Co., The, 500 Fifth Ave., New York City.  
 ●Ruby Chemical Co., 66 McDowell St., Columbus, O.  
 Rudy Furnace Co., Dowagiac, Mich.  
 Rupp Forge & Shear Co., 10312 Meech Ave., Cleveland, O.  
 Russell Electric Co., 342 W. Huron St., Chicago, Ill.  
 Russell Insulation Co., F. C., 235 E. 131st St., Cleveland, O.  
 Russell Mfg. Co., John M., Naugatuck, Conn.  
 Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.  
 ●Rybolt Heater Co., Miller St., Ashland, O.  
 ●Ryerson & Son, Inc., Joseph T., 2558 W. 16th St., Chicago, Ill.  
 Ryniker Sheet Metal Works, Inc., 122-124 N. 25th St., Billings, Mont.

## S

●S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.  
 Saino Mfg. Co., Inc., F. L., 70 W. Colorado Ave., Memphis, Tenn.  
 St. Charles Mfg. Co., St. Charles, Ill.  
 St. Clair Foundry Corp., Beech & Wilson Sts., Centralia, Ill.  
 ●St. Louis Furnace Co., Co., 2901 Elliot Ave., St. Louis, Mo.  
 St. Paul Corrugating Co., Wabash & Water Sts., St. Paul, Minn.  
 ●Sall Mountain Co., 176 W. Adams St., Chicago, Ill.  
 Sallada Mfg. Co., 3816 Grand Ave., S., Minneapolis, Minn.  
 Sampsel Time Control, Inc., Mendota, Ill.  
 Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.  
 Sauereisen Cements Co., 5118 Main St., Sharpsburg Station, Pittsburgh, Pa.  
 Savage Co., W. J., 912 W. Clinch Ave., Knoxville, Tenn.  
 ●Schaefer Brush Mfg. Co., 117 W. Walker St., Milwaukee, Wis.  
 Schatz Mfg. Co., Fairview, Poughkeepsie, N. Y.  
 Schatz Venetian Blinds, Los Angeles, Cal.  
 Schecter Brothers Co., Front & Cumberland Sts., Philadelphia, Pa.  
 Schill Mfg. Co., Mansfield St., Crestline, O.  
 Schoedinger Co., F. O., 322-358 Mt. Vernon Ave., Columbus, O.  
 Schundler & Co., Inc., F. E., Insulation Div., 504 Railroad St., Joliet, Ill.  
 Schwab Furnace & Mfg. Co., 193 S. Second St., Milwaukee, Wis.  
 Schwab Safe Co., Lafayette, Ind.  
 ●Schwitzer-Cummins Co., Fan St., Indianapolis, Ind.  
 Scott-Newcomb, Inc., 1929 Pine St., St. Louis, Mo.  
 ●Scovill Mfg. Co., Morency-Van Buren Div., Prairie Ave., Sturgis, Mich.  
 ●Scully Steel Products Co., 1319 W. Wabansia, Chicago.  
 Sealkote Corp., 40 S. Clinton St., Chicago, Ill.  
 Seamlux Co., 5-18 48th Ave., Long Island City, N. Y.  
 Security Stove & Mfg. Co., 1630 Oakland, Kansas City, Mo.  
 Seep-Lok Flashing Co., Inc., 63 Hawthorne Ave., Yonkers, N. Y.  
 Self-Vulcanizing Rubber Co., Inc., 605 W. Washington Blvd., Chicago, Ill.  
 Sentry Mfg. Co., 505 Baum Bldg., Omaha, Nebr.  
 Serval, Inc., Electric Ref. & Air Cond. Div., 119 Morton Ave., Evansville, Ind.  
 Service Machine Co., 750-760 Broadway, Elizabeth, N. J.  
 ●Shamblen Furnace Parts Co., 231-39 First Ave., Pittsburgh, Pa.  
 Shakeproof Lock Washer Co., 2501 N. Keeler Ave., Chicago, Ill.  
 Sharon Steel Corp., Sharon, Pa.  
 Shedlov Oil Burners, Inc., 717 Third Ave., S. Minneapolis, Minn.  
 Sheer Co., H. M., 2nd & Hampshire Sts., Quincy, Ill.  
 Sheet Metal Products Co., 320 S. Commercial St., Peoria, Ill.  
 Sheldon Slate Products Company, 43 Main St., Granville, N. Y.  
 Slight Feed Generator Co., 14 N. Tenth St., Richmond, Ind.  
 Signal Electric Mfg. Co., Menominee, Mich.  
 Silent Glow Oil Burner Corp., 1477 Park St., Hartford, Conn.  
 Silent Sioux Oil Burner Corp., Orange City, Ia.  
 Simplex Manufacturing Co., 200 North Main St., Fond du Lac, Wis.  
 Simplex Oil Heating Corp., 21 West St., New York City.  
 Sinker-Davis Co., 230 S. Missouri St., Indianapolis, Ind.  
 Sioux City Foundry and Boiler Co., East 8th & Division Sts., Sioux City, Iowa.  
 ●Skillsaw, Inc., 5033 Elston Ave., Chicago, Ill.  
 Skinner Co., E. W., 402 Pearl St., Fitchburg, Mass.  
 ●Skuttle Co., J. L., 999 Franklin St., Detroit, Mich.  
 Sly Mfg. Co., W. W., 4736 Train Ave., Cleveland, O.  
 Smidh & Co., F. L., 225 Broadway, New York City.  
 Smith & Kanzler, Inc., 516 Lidgerwood Ave., Elizabeth, N. J.

Smith, Inc., Winfield H., Eaton St., Springville, N. Y.  
 Smith Heater Co., Peter, 6209 Hamilton St., Detroit, Mich.  
 Smith Welding Equipment Corp., 2619-33 Fourth St., S. E., Minneapolis, Minn.  
 Snap-On Mfg. Co., 1028 Blue Island Ave., Chicago, Ill.  
 Somers, Inc., H. J., 6063 Wabash Ave., Detroit, Mich.  
 Sonner Burner Co., 6th & Andrews, Winfield, Kan.  
 South Bend Air Products, Inc., 322 E. Colfax, South Bend, Ind.  
 Southbridge Roofing Co., Inc., Hartwell & Chapin Sts., Southbridge, Mass.  
 Southern States Iron Roofing Co., Stiles Ave., Savannah, Ga.  
 Southworth Machine Co., 30 Warren Ave., Portland, Maine.  
 Specialty Converters, Inc., 161 E. Erie St., Chicago, Ill.  
 Sprayway Mfg. Co., 1854 S. 52nd Ave., Cicero, Ill.  
 Spencer Air Conditioning Service, 1237 Acoma St., Denver, Colo.  
 Spencer Heater Division, Ft. Park St., Williamsport, Pa.  
 Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.  
 Spencer Turbine Co., 484 New Park Ave., Hartford, Conn.  
 Spray Engineering Co., 114 Central St., Somerville, Mass.  
 Spraying Systems Co., 4922 W. Grand Ave., Chicago, Ill.  
 Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago, Ill.  
 Spray-Wheel Air Conditioners, Inc., 1320 19th St., Denver, Colo.  
 Springman Metal Specialty Co., 424 Bellevue Ave., Detroit, Mich.  
 Spun Steel Corp., 2037 Dueber Ave., S. W., Canton, O.  
 Square D Co., 6060 Rivard St., Detroit, Mich.  
 Standard Air Conditioning, Inc., 40 W. 40th St., New York City.  
 Standard Asbestos Mfg. Co., 820-22 W. Lake St., Chicago, Ill.  
 Standard Engineering Works, 289 Roosevelt Ave., Pawtucket, R. I.  
 Standard Foundry & Furnace Co., 1801 Pleasant St., De Kalb, Ill.  
 Standard Fuel Engineering Co., 667 Post Ave., South, Detroit, Mich.  
 Standard Furnace & Supply Co., 407-13 S. 10th St., Omaha, Nebr.  
 Standard Galvanizing Co., 2619 W. Van Buren St., Chicago, Ill.  
 Standard Heating & Radiator Co., 704 Second Ave., Pittsburgh, Pa.  
 Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.  
 Standard Rolling Mills, Inc., 143 Jewel St., Brooklyn, N. Y.  
 ●Standard Stamping & Perforating Co., 3131 W. 49th Pl., Chicago, Ill.  
 ●Stanley Electric Tool Div., The Stanley Works, Elm St., New Britain, Conn.  
 Stanley Tools, New Britain, Conn.  
 Stanton Heater Co., Martins Ferry, O.  
 Star Electric Motor Co., 197 Grove St., Bloomfield, N. J.  
 ●Star Radiator Co., 649 Ceres Ave., Los Angeles, Cal.  
 Staynew Filter Corp., 25 Leighton Ave., Rochester, N. Y.  
 Steel and Tubes, Inc., 224 E. 131st St., Cleveland, O.  
 Steel Products Engineering Co., Columbia St. at Dakota Ave., Springfield, O.  
 Steelweld Machinery Co., E. 70th & Machinery Ave., Cleveland, O.  
 Sterling Foundry Co., Sterling, Ill.  
 Ster-Na-Man Fdry. Co., 441 Williams St., Springfield, Ill.  
 Stewart Foundry, O. S., 887 E. 67th St., Cleveland, O.  
 Stewart Ice Machine Co., 1046 East 22nd St., Los Angeles, Cal.  
 Stiglitz Furnace & Foundry Co., 2007-23 Portland Ave., Louisville, Ky.  
 Stilphen Engineering & Mfg. Co., C. A., 1129 Eighteenth St., Denver, Colo.  
 Stok-A-Fire Co., Inc., 6504 Olive St., University City, Mo.  
 Stokerette Mfg. Co., 4540 Ravenswood Ave., Chicago, Ill.  
 Stokermatic Co., 1415 S. State St., Salt Lake City, Utah.  
 Stoker Products, Inc., 221 W. Prairie Ave., Decatur, Ill.  
 Stover Mfg. & Engine Co., N. Henderson Ave., Freeport, Ill.  
 Stran-Steel Division, Great Lakes Steel Corp., 6100 McGraw Ave., Detroit, Mich. (Ecorse Plant)  
 Stratton & Terstegge Co., 15th & Main St., Louisville, Ky.  
 Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.  
 Structural Slate Co., Robinson Ave., Pen Argyl, Pa.  
 Sturtevant Co., B. F., Damon St., Hyde Park, Boston, Mass.  
 Summerheat Co., 406 S. Columbia, South Bend, Ind.  
 Sundstrand Engineering Co., 1327 Seventh St., Rockford, Ill.  
 Sun-Ray Oil Burner Corp., 114-02 Beach Channel Dr., Rockaway Park, N. Y.  
 ●Superior Sheet Steel Co., The, Division of Continental Steel Corp., Canton & Louisville Rd., Canton, O.  
 Superior Steel Corp., Grant Bldg., Pittsburgh, Pa.  
 Supreme Air Filter Co., 126 W. 21st St., New York City.  
 Supreme Electric Products Corp., 99 Mt. Hope Ave., Rochester, N. Y.  
 Supreme Heater & Ventilating Corp., 1911 N. Market St., St. Louis, Mo.  
 Surface Combustion Corp., 2375 Dorr St., Toledo, O.  
 Swaby Mfg. Co., 2010-2014 Marshall Blvd., Chicago, Ill.  
 Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis, Mo.  
 ●Swartwout Co., 18615 Euclid Ave., Cleveland, O.  
 Swedish Venetian Blind Co., 601 W. 26th St., New York City.  
 Swift Corp., Carl E., North Side, Holland, Mich.

● Advertisement in this issue. See Index to Advertisers, page 168.



Swift Mfg. Company, 247 McDougall Ave., Detroit, Mich.  
 Synco-Flame Burner Corp., 57 Worth St., Willimantic, Conn.  
 Syncromatic Air Conditioning Corp., 3373 N. Holton St., Milwaukee, Wis.  
 Syracuse Fire Door Corp., 900 Canal St., Syracuse, N. Y.

## T

Taco Heaters, Inc., 342 Madison Ave., New York City.  
 Tagliabue Mfg. Co., C. J., Park & Nostrand Aves., Brooklyn, N. Y.  
 Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.  
 Tannewitz Works, 315 Front Ave., N. W., Grand Rapids, Mich.  
 Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md.  
 Taylor Instrument Companies, 95 Ames St., Rochester, N. Y.  
 Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.  
 Technical Coatings, Inc., 9-15 Park Place, New York City.  
 Tecumseh Products Co., Tecumseh, Mich.  
 Tem Products Co., Midland, Pa.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Thatcher Furnace Company, 39 St. Francis St., Newark, N. J.  
 Thermal Units Mfg. Co., Meriden, Conn.  
 Therminsul Corp., 1603 Fulford St., Kalamazoo, Mich.  
 Thermold Rubber, Div. of Thermold Co., Whitehead Rd., Trenton, N. J.  
 Thiele Furnace Co., Inc., 1011 Fayette St., Indianapolis, Ind.  
 Thompson & Company, Box 6757, Pittsburgh, Pa.  
 Thompson Mfg. Co., 30th & Larimer Sts., Denver, Colo.  
 Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn, Mass.  
 ThruBond Flashing Corp., 525 E. 136th St., New York City.  
 Tierney Rotor Ventilator Co., 239 4th Ave., S., Minneapolis, Minn.  
 Tiffin Art Metal Co., Broad & Second Ave., Tiffin, O.  
 Timken Silent Automatic Div., Timken-Detroit Axle Co., 100 Clark Ave., Detroit, Mich.  
 Tite Flex Metal Hose Co., 500 Frelinghuysen Ave., Newark, N. J.  
 ● Todd Air Conditioning Co., Inc., Bonner Springs, Kan.  
 Todd Combustion Equipment, Inc., Ft. of 23rd St., Brooklyn, N. Y.  
 Torchweld Equipment Co., 1035 W. Lake St., Chicago, Ill.  
 Tork Clock Co., Inc., 31 South St., Mt. Vernon, N. Y.  
 Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.  
 Townsend Co., New Brighton, Pa.  
 Trade-Wind Motor Fans, Inc., 1325 Maple Ave., Los Angeles.  
 ● Trane Co., The, La Crosse, Wis.  
 Trenton Auto Radiator Wks., 630 Brunswick Ave., Trenton, N. J.  
 Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.  
 Trindl, Inc., Jos. H., 2613 S. Michigan Blvd., Chicago.  
 Triox Engineering Co., 207 Board of Education Bldg., St. Louis, Mo.  
 Tropic-Air Stoker Co., 401 Schroyer Ave., S. W., Canton, Ohio.  
 Tropical Paint & Oil Co., 1244-36 W. 70th St., Cleveland, O.  
 Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.  
 Truscon Laboratories, 1710 Caniff Ave., Detroit, Mich.  
 Truscon Steel Co., Albert St., Youngstown, O.  
 Turner & Seymour Mfg. Co., Lawton St., Torrington, Conn.  
 Turner Brass Works, 823 Park Ave., Sycamore, Ill.  
 Turney Corp., Muskegon, Mich.  
 Tuttle Air Filter Co., Inc., 1014 W. Main St., Louisville, Ky.  
 ● Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.  
 ● Twentieth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

## U

Uehling Instrument Co., 473 Getty Ave., Paterson, N. J.  
 Una Welding, Inc., 1615 Collamer Ave., Cleveland, O.  
 Unified Air Conditioner Co., 322 W. Michigan St., Duluth, Minn.  
 Uniflow Mfg. Co., East Lake Road, Erie, Pa.  
 Union Steam Pump Co., Jefferson Ave., Battle Creek, Mich.  
 Unit Heater & Cooler Co., 1002-1024 Third St., Wausau, Wis.  
 United American Bosch Corp., 3664 Main St., Springfield, Mass.  
 United Cork Companies, Central Ave. & N. J. Central R. R., Kearny, N. J.  
 United Electric Controls Co., 69 "A" St., South Boston, Mass.  
 United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City, N. Y.  
 United Motors Service, Detroit, Mich.  
 U. S. Air Conditioning Corp., 2105 Kennedy St., N. E., Minneapolis, Minn.  
 United States Brass & Copper Co., Hyde Park Ave., Hyde Park, Mass.  
 United States Burner Corp., 191 Franklin Ave., Hartford, Conn.

U. S. Cistern Filter Mfg. Co., The, 509 S. McClun St., Bloomington, Ill.  
 United States Gypsum Co., 300 W. Adams St., Chicago, Ill.  
 U. S. Machine Corporation, Lebanon, Ind.  
 U. S. Mineral Wool Co., 9 S. Clinton St., Chicago.  
 United States Radiator Corp., 1056 National Bank Bldg., Detroit, Mich.  
 ● United States Register Co., Burnham St., Battle Creek, Mich.  
 United States Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.  
 Uni-Therm, Inc., P. O. Box 83, Elyria, O.  
 Universal Air Filter Corp., 332 W. Michigan St., Duluth, Minn.  
 Universal Blower Co., 124 S. Woodward Ave., Birmingham, Mich.  
 ● Universal Cooler Corp., 7214 Melville St., Detroit, Mich.  
 Universal-Cyclops Steel Corp., Bridgeport, Pa.  
 Universal Power Corp., 4300 Euclid, Cleveland, O.  
 Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.  
 Upson Co., The, Upson Point, Lockport, N. Y.  
 Utica Radiator Corp., 2201 Dwyer Ave., Utica, N. Y.  
 ● Utility Fan Corporation, 2528 Santa Fe Ave., Los Angeles, Cal.

## V

Vacuum Gas Burner Corp., 115 N. Union St., Olean, N. Y.  
 Vall Mfg. Co., 1017 Columbia Ave., Fort Wayne, Ind.  
 Valley Mfg. Co., Fryeville, Athol, Mass.  
 Van Noorden Co., E., 100 Magazine St., Boston, Mass.  
 Van Osdel Mfg. Co., N. K., 85 Devon Road, Bloomfield Hills, Mich.  
 Vendor Slate Co., Inc., P. O. Box 204, Nazareth, Pa.  
 Vent-O-Lite Co., 4230 W. Taylor St., Chicago, Ill.  
 Vento Steel Sash Co., Muskegon, Mich.  
 Vermont Structural Slate Co., Fair Haven, Vermont.  
 Verson Allsteel Press Co., 1351 E. 93rd St., Chicago.  
 Vibration Eliminator Co., 2508-37th Ave., Long Island City, N. Y.  
 ● Victor Electric Products, Inc., 737 Reading Rd., Cincinnati, Ohio.  
 Victor Equipment Co., Kimball-Krogh Pump Div., 1010 E. 62nd St., Los Angeles, Cal.  
 Victor Oil Burner Mfg. Co., 250 Pleasant St., Hartford, Conn.  
 Vigor-Aire Corp., 127 S. Fifth St., Philadelphia, Pa.  
 ● Viking Air Conditioning Corp., Main & Center Sts., N. W., Cleveland, O.  
 Viking Mfg. Co., 600 S. High St., Akron, Ohio.  
 Viking Pump Co., 404 State St., Cedar Falls, Ia.  
 Viking Shear Co., 1063 19th St., Erie, Pa.  
 Vilter Mfg. Co., 2217 S. First St., Milwaukee, Wis.  
 Volcano Burner Corp., 575 E. 184th St., New York City.  
 Von Seebeck, G., 40 Wall St., Room 3801, New York City.  
 Vortex Mfg. Co., 687 N. Tillamook St., Portland, Ore.  
 Vulcan Electric Co., Lynn, Mass.

## W

Waddell, Bruce, 2829 Northwestern Ave., Indianapolis, Ind.  
 Wagner, C. DeWitt, 1000 2nd St., S. E., Cedar Rapids, Ia.  
 Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.  
 Walker Mfg. & Sales Corp., 1711-1717 Penn St., St. Joseph, Mo.  
 Wall Mfg. Supply Co., P., 3126 Preble Ave., Pittsburgh, Pa.  
 ● Walsh Refractories Corp., 4430 N. First St., St. Louis, Mo.  
 Ward Co., H. H., Chester, Pa.  
 Ward Heater Co., Ltd., 1800 W. Washington Blvd., Los Angeles, Cal.  
 Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.  
 ● Ward Machinery Co., 564 W. Washington Blvd., Chicago, Ill.  
 Ward Mfg. Co., 107-11 E. Milwaukee Ave., Detroit, Mich.  
 Warren Shade Co., Inc., 2905 E. Hennepin Ave., Minneapolis, Minn.  
 Washington Stove Works, 3402-22 Smith Ave., Everett, Wash.  
 ● Waterloo Register Co., 2520 E. Fourth St., Waterloo, Ia.  
 ● Waterman-Waterbury Co., 1122 Jackson St., N. E., Minneapolis, Minn.  
 Wattenamel Co., 7400 Archer Ave., Summit, Ill.  
 Watts Regulator Co., 10 Embankment St., Lawrence, Mass.  
 Wayne Oil Burner Corp., 800 Glasgow Ave., Fort Wayne, Ind.  
 Wayne Pattern & Foundry Co., 236 Murray St., Fort Wayne, Ind.  
 Weatherhead Co., 300 E. 131st St., Cleveland, O.  
 Webster Electric Co., Dekoven Ave. & Clark St., Racine, Wis.  
 Well Pump Co., 215 W. Superior St., Chicago, Ill.  
 Weinman Pump Co., 290 Spruce St., Columbus, O.  
 Weirton Steel Co., Weirton, W. Va.  
 Weiss & Co., H., 113-115 Mercer St., New York City.  
 Wellex, Inc., 9666 E. Jefferson St., Detroit, Mich.  
 Welding Apparatus Co., 4309 Ogden Ave., Chicago, Ill.  
 Welding Timer Mfg. Co., 125 Sussex St., Newark, N. J.  
 Wells Mfg. Corp., 315 Seventh Ave., Three Rivers, Mich.  
 Westchester Home Equipment Co., Inc., 432 Austin Pl., Bronx, N. Y.  
 Western Blower Co., 1800 Airport Way, Seattle, Wash.  
 Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles.

● Advertisement in this issue. See Index to Advertisers, page 168.

Western Felt Works, 4027 Ogden Ave., Chicago, Ill.  
 Western Furnaces, Inc., 3002-13 S. Chandler St., Tacoma, Wash.  
 Western Precipitation Corp., 1016 W. 9th St., Los Angeles.  
 Western Venetian Blind Co., 601 W. 26th St., New York City.  
 Western Wire & Iron Works, Inc., 945 W. 18th Pl., Chicago, Ill.  
 Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., East Springfield, Mass., and Cleveland.  
 Weston Electrical Instrumental Corp., 614 Frelinghuysen Ave., Newark, N. J.  
 Westwick & Son, Inc., John, Claude & Meeker Sts., Galena, Ill.  
 Wheeling Corrugating Co., Wheeling Steel Bldg., Wheeling, W. Va.  
 Wheeling Metal & Mfg. Co., Box 56, Wheeling, W. Va.  
 Wheeling Steel Corp., Wheeling Steel Bldg., Wheeling, W. Va.  
 White & Company, Haydn F., 1740 E. 12th St., Cleveland.  
 ● White Mfg. Co., 2362 University Ave., St. Paul, Minn.  
 White-Rodgers Electric Co., 1209 Cass Ave., St. Louis, Mo.  
 Whiting Corp., Harvey, Ill.  
 Whitlock Coil Pipe Co., 100 South St., Hartford, Conn.  
 ● Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.  
 ● Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill.  
 Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.  
 Wiedemann Machine Co., 1815 Sedgley Ave., Philadelphia.  
 Wilder Mfg. Co., P. O. Box 189, Niles, Ohio.  
 Wilhelm Co., A., 3rd & Bern Sts., Reading, Pa.  
 Willard Metallic Crypt Co., Air Conditioning Div., Willard, Ohio.  
 Will-Burt Co., Orrville, O.  
 Williams Oil-O-Matic Heating Corp., 1201 E. Bell, Bloomington, Ill.  
 ● Williams-Wallace Co., 160 Hooper St., San Francisco.  
 Williamson Heater Co., 337 W. Fifth St., Cincinnati, O.  
 Willis Mfg. Co., Inc., 156 N. Academy St., Galesburg, Ill.  
 Will-Weld Mfg. Co., Inc., 600-620 S. 15th St., Omaha, Nebr.  
 Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago, Ill.  
 Wilson Co., H. A., 97 Chestnut St., Newark, N. J.  
 ● Wilson, Inc., Grant, 4101 W. Taylor St., Chicago, Ill.  
 Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.  
 Winchester Repeating Arms Co., 275 Winchester Ave., New Haven, Conn.  
 Windshield Scupper Co., Div. Sargent Bldg., Specialties Co., 16 Warren St., New York City.  
 Wing Mfg. Co., L. J., 154 W. 14th St., New York City.  
 Wipe-On Corporation, Ind. Div., 105 Hudson St., New York City.  
 Wisconsin Heating & Draft Control Co., Oshkosh, Wis.  
 ● Wise Furnace Co., 101 Lincoln St., Akron, O.  
 ● Wiss & Sons Co., J., 33 Littleton Ave., Newark, N. J.  
 Wittenmeyer Machinery Co., 850 N. Spaulding Ave., Chicago, Ill.  
 ● Wodack Electric Tool Corp., 4644 W. Huron St., Chicago.

● Advertisement in this issue. See Index to Advertisers, page 168.

Wolfe Engineering & Mfg. Co., 1136 Market St., Harrisburg, Pa.  
 Wolff Coal Saver Co., 1330 W. Congress St., Chicago, Ill.  
 Wolverine Blower Works, 412 Prospect Ave., Grand Rapids, Mich.  
 Wolverine Tube Co., 1419 Central Ave., Detroit, Mich.  
 Wood Conversion Co., First National Bank Bldg., St. Paul, Minn.  
 Wood Industries, Inc., Gar, 7924 Rlopelle St., Detroit, Mich.  
 Wood Steel Co., Alan, Conshohocken, Pa.  
 Wood's Sons Co., T. B., Fifth Ave., Chambersburg, Pa.  
 Woodard & Co., Thos. S., 846 Clinton Ave., South, Rochester, N. Y.  
 Woolery Machine Co., 2919 Como Ave., S. E., Minneapolis, Minn.  
 Woolwine Metal Products Co., Atlantic Blvd. & S. Riverside Dr., Los Angeles, Cal.  
 Wooster Art Wood, Inc., P. O. Box 198, Wooster, O.  
 Worcester Brush & Scraper Co., Div. Mason Worcester Co., 38 Austin St., Worcester, Mass.  
 Worthington Pump & Machinery Corp., Worthington Ave., Harrison, N. J.  
 Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.  
 Wrought Washer Mfg. Co., 2227 South Bay St., Milwaukee.

## X

XL Refrigerating Co., Inc., 1834 W. 59th St., Chicago, Ill.  
 ● XXth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

## Y

Yardly Screen & Weather Strip Co., 142 Parsons Ave., Columbus, O.  
 Yeomans Bros. Co., 1433 Dayton St., Chicago, Ill.  
 Yoder Co., 5500 Walworth Ave., Cleveland, O.  
 York Corrugating Co., Adams St. & WM RR., York, Pa.  
 York Ice Machinery Corp., Roosevelt Ave., York, Pa.  
 York Oil Burner Co., Inc., Jessop Place & P. R. R., York, Pa.  
 Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati, O.  
 Young Radiator Co., 709 Marquette St., Racine, Wis.  
 Young Regulator Co., 4500 Euclid Ave., Cleveland, O.  
 ● Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

## Z

Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.  
 Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.  
 Zenith Electric Company, 607 S. Dearborn St., Chicago.  
 Zonolite Co., 5905 Second Blvd., Detroit, Mich.

# ROUND OAK

*Greater Values in Cast and Steel*  
**Furnaces FOR COAL OR OIL**

*-headlined by X-80*

**THE SENSATIONAL NEW  
OIL FIRED CONDITIONER  
FOR SMALL HOMES**



Since its introduction six months ago, X-80 has proved the most startling development in small home heating. Sold as a package complete with burner, blower, heater, filters, humidifier and controls at an attractive price, the X-80 is breaking the great small home market wide open for Round Oak dealers.



Round Oak enters 1939 with greater values all along its well rounded line of Heating and Air Conditioning equipment. Notable improvements make these famous products even easier to sell than heretofore.

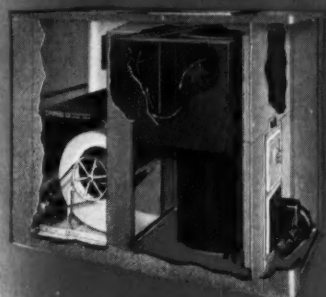
The addition of several units in both its coal and oil burning series provide a thoroughly complete and profitable line of heating equipment for any dealer. This year investigate Round Oak. Find out why Round Oak dealers are happy dealers — why they are making money. It's no secret and we'll tell you if you'll only say the word. **DROP US A LINE TODAY FOR COMPLETE INFORMATION.**

**THE ROUND OAK COMPANY  
DOWAGIAC, MICH.**



The famous "Contraflow"—Round Oak's own Oil Burner. Combines the principles of gun and rotary type burners. Exclusive features make for great economy in small installations. Gun type burner available for larger jobs.

*Here's the PROFIT LINE for '39*



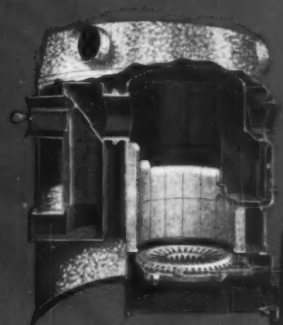
Round Oak Oil Fired Air Conditioners come in beautiful cabinets of Hammer-oid Blue Steel. XA-200, illustrated, and smaller sizes are complete with Round Oak burner, furnace, blower, filters, humidifier and controls.



Coal Master (illustrated) and Coal Master Airlensers systems are designed exclusively for automatic stoker firing. Features include clinker removing receptacle and extension permitting stoker installation on either side.



Blended-Iron Furnace. Only Round Oak J-series cast iron furnaces have patented diamond-shaped, one-piece radiators which give unusual efficiency due to longer fire travel and radiating surface. Built in several sizes.



Boiler-Plate Furnace—electrically arc welded of extra heavy gauge boiler plate for longer life, efficient and dependable service. All sizes equipped with refractory linings and duplex grates with upright shaker.

**ROUND OUT *with* ROUND OAK**

**THE COMPLETE LINE OF WARM AIR EQUIPMENT**

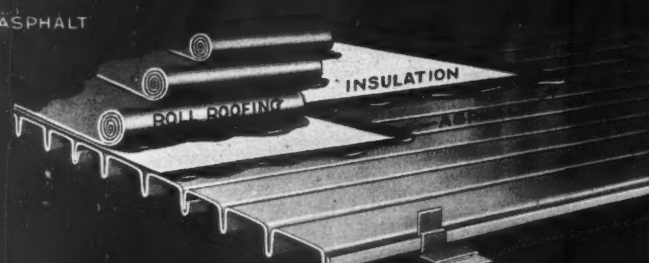


Profitable business is waiting for you—on **MILCOR** Steel Roof Deck



Stores  
Filling Stations  
Garages  
Office Buildings  
Factories  
Warehouses

ASPHALT



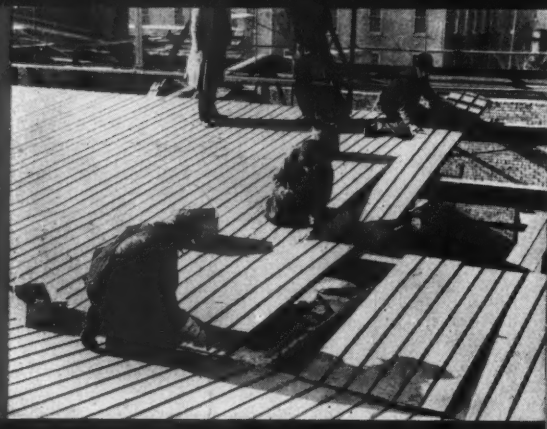
# **MILCOR** Steel Roof Deck

makes the deck job your job  
on many types of buildings

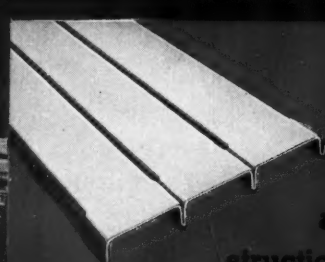
Attaching  
Purlin  
Clip



No mess  
to clean up



Smooth  
surface—  
insulation  
lays with  
ease



Deck work is an important, profitable part of your business with Milcor Steel Roof Deck. Its adaptability to any type of building construction brings plenty of jobs to your shop for large or small industrial buildings — stores, garages, warehouses, filling stations.

Milcor Roof Deck is light in weight, easy to handle, and easily attached — with clips or welding — to any structural member. Its unique offset enables you to nest sections so easily, every job's a fast-running job — and a profitable one.

You are assured of owner satisfaction, too, for Milcor Roof Deck is lower in cost than any other type of roof with equal insulating efficiency...firesafe...permanent. Cash in now on the growing popularity of Milcor Steel Roof Deck for industrial use — not only on the roof, but for many other uses . . . Write today for practical, colorful bulletin, giving complete information.

Unit of  
**MILCOR SYSTEM** of  
fireproof construction  
Milcor here uses the word "system" in its true sense — not to signify a limited, inflexible set-up applicable only under certain conditions, but to represent so great a range of individual products, types, weights, metals, etc., that a complete, coordinated metal backbone can be designed to suit any condition of fireproof construction — all with Milcor products engineered to work together.

**MILCOR STEEL COMPANY**  
MILWAUKEE, WISCONSIN CANTON, OHIO  
CHICAGO, ILL. • KANSAS CITY MO. • LA CROSSE, WIS. • ATLANTA  
• NEW YORK, N. Y. • ROCHESTER, N. Y.  
Sales Offices: Minneapolis, Minn., Little Rock, Ark., Dallas, Tex., Denver, Colo.,  
Washington, D. C., Boston, Mass.